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AND THE RECORDING OF

AMERICAN AND OTHER PATENTED INVENTIONS.

AUGUST, 1830.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN MAY, 1830.

With Remarks and Exemplifications, by the Editor.

1. For *Sundry Machines for the purpose of Checking, or Retarding, the velocity of Road Wagons,* stages, and other wheeled carriages, denominated "Jones' Wagon Lock;" Samuel Jones, Bridgeport, Fayette county, Pennsylvania, May 4.

An elaborate description of eleven pages introduces us to an acquaintance with this invention, or rather these inventions, which consist of different modes of accomplishing the same object.

A friction bar is to be made to press against the front part of the hind wheels of the wagon or carriage; this friction bar is to exceed in length the distance between the wheels; such a bar it is particularly stated, has been long in use, but the present patentee claims as new the application of *friction blocks* upon the friction bar. A dovetailed notch is to be cut into the bar, opposite to each wheel, and blocks of wood are fitted into these notches; the blocks being wedge shaped, are readily knocked out and replaced, as they wear away. It is proposed to face some of these blocks with iron.

Divers modes are proposed of causing the friction blocks to bear against the wheels, as will be perceived by the subjoined claim, which must complete our account of this invention.

"What I claim as new, and as my own invention, or discovery, in the above described machines, and for which I ask an exclusive privilege, is as well the improvement of the dovetailed and wedge

shaped notches in the friction bar, and of the temporary blocks of wood, &c. to be applied to the wheels of road wagons, stages, &c. as herein specified, and the machines, or methods of applying the friction bar with the blocks, as herein described, and before claimed to be my invention, under the heads of No. 1, 2, 3 and 4; all involving the same principle of the hand lever; No. 5, involving the principle of the screw and crank; No. 6, involving beside the hand lever, and the crank, the pinion and rack; and No. 7, involving the principle of the wedge; as also the main general principle which is involved in all of them, of the manual application, and maintainance at pleasure, of a sufficient, regular and determinate friction, against the wheels of the wagon, carriage, &c. through the means of the mechanical powers: and which may be performed with ease and expedition, without stopping the horses to apply it."

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2. For a *Perpetual Calender;* John O'Hara, Philadelphia, as assignee of the inventor, John L. Dagg, Philadelphia, Pennsylvania, May 4.

This calender may be formed upon a flat surface, in a manner similar to such as have been previously patented, but Mr. O'Hara, the assignee of the inventor, attaches it to an ever-pointed pencil case, in the manner in which the days of the month have heretofore been attached. By its aid the day of the week on which any event happened, may be found with very great facility, the date being given. The arrangement is neat and simple, and if it is not a thing of very great utility, it is calculated to resolve inquiries which are frequently interesting. The particular arrangement of the words and figures would require a diagram for their explanation; we refer the curious, therefore, to the article itself, which, whilst it may satisfy them, will serve the manufacturer, and encourage the arts.

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3. For an improvement in that part of the *Ingrain Carpet Loom,* which is called the engine; Josiah R. Clark, South Coventry, Tolland county, Connecticut, May 7.

(See specification.)

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4. For an improvement in the machine for *Cleaning or Preparing of Paddy, or Rough Rice,* for culinary purposes; John L. Norton, of the City of New York, at present residing in Charleston, South Carolina, May 7.

(See specification.)

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5. For a *Thrashing Machine;* Noah Lindsey, Catskill, Greene county, New York, May 7.

A feeding apron on rollers, a cylindrical beater, a hollow segment equal to about $\frac{1}{4}$ of a circle, containing rollers extending its whole length, and several other parts, are exactly like those repeatedly ap-

plied in thrashing machines. The segment is to be sustained by an elastic thrashing floor, consisting of slats of wood which extend along under the feeding apron, to a distance from the beaters, and are there secured.

"The subscriber claims the sole privilege of applying to this machine, his spring bed, or thrashing floor, which yields to the cylinder, as a thicker or heavier substance passes in; as stones, &c. This spring bed, or thrashing floor, as before mentioned, is formed by the rollers with their supports attached to springs, which by means of the keys before mentioned may be set at any distance from the cylinder, or as near to it as may be necessary; thus constituting the most important part of this improvement."

The concave segment has been sustained by springs in most of the patented thrashing machines; the present plan is merely one of those variations which may be made in machines in general, whilst the principle of action remains unaltered; such a variation, it is true, is sometimes a very important improvement; we shall be glad to hear that the present may prove to be so.

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6. For a *Machine for Cutting Grass, Grain, &c.;* Erastus Ingersoll, Farmington, Oakland county, Michigan Territory, May 7.

Runners, bearing some resemblance to those of a sleigh, are framed together. A roller, extending across from one of these to the other, at the back part, rests upon the ground, and revolves when the machine is drawn forward. Two pieces, serving as shafts, extend forward, being secured by proper framing. The mowing, or cutting part, is a horizontal wheel, about 8 feet in diameter, running near to the ground, its lower gudgeon fitted in a piece framed across the runners, and its upper in one of the shaft pieces. A band from the roller, extends to a whirl on the axis of this cutting wheel, to give it motion. The cutters are knives fitted on to the periphery of the wheel, so as to form a complete circle; the claim is to "the before described machine for cutting grass, grain, &c."

We recollect a model of a similar machine in the patent office, of long standing, but independently of this, we apprehend that there are few grounds over which a horizontal cutting wheel of eight feet in diameter can be drawn with advantage. Will not such a wheel be obstructed by heavy grass and grain? and will the friction of the roller on the ground be always sufficient to give it motion?

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7. For an improved *Cooking Stove;* John Moore, Acworth, Sullivan county, New Hampshire, May 7.

This is an oval stove, having the general form of the common ten plate stove. There is nothing in it meriting particular notice, as it merely differs in the form and arrangement of its parts from a number of others; the only things claimed are "two flues which admit the heat under the two upper boilers."

8. For an improvement in the *Spindles used in Spinning, and in the Throstle Frame;* Benjamin Brundred, Oldham, Bergen county, New Jersey, May 7.

Three different modes of constructing spindles are described, and claimed as new; the description is very clearly given, by the aid of a well executed drawing. They are all fixed, or still spindles. In the first, a brass tube is fitted upon the spindle, extending down to the bobbin lifter, and upwards about two-thirds of the length of the spindle. On the lower part of this tube is a whirl by which it is turned, and on the upper part the bobbin is fitted. The upper end of the spindle is hollow, being drilled down to the depth of two or three inches; a small spindle fits and turns in this drilled hole, having flyers attached to its upper end. The operation of this spindle need not be described to those who are familiar with such machinery. The two others are different modifications of this spindle, which are ingenious, but more complex than the former.

The improvement in the throstle frame consists in extending arched pieces from the extreme supports of the frame, to sustain it on the floor, instead of the many legs upon which it usually stands, subjecting the machine to derangement from the sinking of the floor in any part.

The claims are to the various modes of constructing the spindles, and to the arched supports of the throstle frame.

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9. For an improvement in the manner of *Crimping Boot Fronts;* Joseph H. Punchard, Boston, Massachusetts, May 8.

Boot crimpers have of late held a conspicuous place among the patents issued. That which is the subject of the present patent bears a strong resemblance to one patented by Mr. Dunbar, (page 299 of our last volume;) it, however, is less complex, and has the *form* fixed, and the jaws of the crimper moveable, whilst the reverse is the case in Mr. Dunbar's.

We cannot enter into all the minutia of this contrivance, but from the following quotation, must leave the craft to form the best judgment they can respecting it.

"In using said machine after preparing the leather in the usual way, I apply the boot front on the top of the stationary form, in the usual way, and smooth it down a little with the hands; I then bring over the arms, or lever, with a smart pressure, and force it over the form, quite clear of the boot front; one operation is sufficient to crimp it thoroughly, and prepare it for the common moveable form; the arms, or lever, being pressed quite clear of the boot front, the work is removed with the greatest possible ease."

"The mechanical improvement upon which I particularly rely, and for which I claim the protection of letters patent, is the fixing of the board, or form, on which the boot fronts are spread, and forcing the arms, or lever, upon them in this situation, to be crimped; whereby the work is wholly in sight, and produced more perfectly, in less time, and infinitely less labour, than in any other mode."

10. For an improvement in the mode of *Dressing Staves;* Charles B. Goodrich, Rutland, Worcester county, Massachusetts, May 10.

This is an ingeniously constructed, well arranged, and, we apprehend, a successfully operating machine. The description and drawings are every thing that can be desired.

Both sides of the stave are operated upon at the same time, one being cut concave, and the other convex. The operating part of the machine to which the cutters are fixed, are somewhat in the form of the letter D, there being pivots upon which it turns placed in the middle of the straight side, this being the centre of the circular part. The circular part is double, consisting of two circular rims, or felloes, the outer rim having planes, or cutters, on the inside, or concave part, and the inner one cutters on the outside, or convex part; between these the stave is to be passed. A vibratory motion is given to the segment; as it comes down the cutting is effected, and as it rises the stave is advanced, until it has passed entirely through.

The claim is to "the application of the planes to the felloes, and to the motion of the felloes backward and forward in part of a circle, dressing the stave on both sides at the same time."

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11. For an improved *Portable Cooking Furnace;* Asael Cross, Cazenovia, Madison county, New York, May 12.

This furnace is to be twelve and a half inches square, and the same in height; it is to be formed of cast iron plates put together. There is to be a fire place, grate, and ash pit below, and an oven above the fire; a space is to be left on each side of the oven for a draft. There is to be a second grate above, upon which also fire may be placed. Cast rims, with openings of various sizes, adapted to vessels of different kinds, may be placed over the upper fire. The purchaser may light it at both ends, or not, as he pleases.

We are informed that "the improvements consist, *first*, in the furnace being *square*, instead of round. *Second*, in the construction of the *oven* in the centre, and being stationary, and throwing the heat all around it; and *lastly*, in the grate and rims at the top, with the great increase of draft and heat."

The *claim* to making a furnace square, may certainly be new, although square furnaces are old enough. The second claim we do not understand, as regards the *stationary* part. Rims to enlarge or contract the opening at the top of a furnace were known to our fathers. The great increase of draft and heat, is not, we apprehend, a part of the furnace, and is rather a strange kind of patentable article.

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12. For a *Thrashing Machine;* Samuel S. Allen, Springport, Cayuga county, New York. Patent first issued November 1st, 1828. Surrendered and cancelled for the purpose of correcting the specification, and reissued May 13th, 1830.

The original machine is noticed at page 117, vol. iii. new series;

the present description does not differ essentially from the former, to which reference may, therefore, be had.

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13. For a machine to facilitate the *Napping of Hats;* A. P. Gregory, Ithaca, Tompkins county, New York, May 13.
(See specification.)

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14. For an improved *Nail Machine*, called the "Reed Machine;" Joseph Hearsey, Wareham, Plymouth county, Massachusetts, May 13.

The intention of this machine is to gripe the nail flatwise, when it is headed. The machine is described generally, without clearly distinguishing what is new. We presume that by calling it the Reed Machine, it is intended to patent an improvement upon that machine. There is no claim, but we are told that "the Reed Machine is rendered capable of griping the nail flatwise when it is headed, and more flat-griped nails can now be made on said machine, in the same time, than on any other machine heretofore invented."

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15. For the *Combination of a Cooking Apparatus, with a Hot Air Furnace;* Joseph Jennings, City of New York, May 14.

The petition states that by this combination, the patentee "can not only perform all that is required for culinary purposes, such as roasting, boiling, baking, frying, broiling, stewing, &c. but also heating every apartment in the house to any agreeable temperature, by conducting the hot air through pipes, or flues, which has not heretofore been used or known."

The specification is in the following words. "I prefer the cooking apparatus set over the furnace, as described in the drawing deposited in the patent office; but it may be placed at the side, or otherwise. The furnace may be of iron, brick, or any other material that may be preferred. The one referred to in the drawing is of cast iron. Any fuel will do, but I prefer anthracite coal. The above is a full and exact description of my said invention.

JOSEPH JENNINGS."

The drawing shows a cylindrical furnace, with bars in front, and is surrounded with brick work, all but the bars, leaving a hot air chamber all around. Above the furnace is an oven of sheet or cast iron, with a space around it leading to the smoke flue. From the hot air chamber flues are to be conducted wherever heat is wanted. Two flues, or openings, are made from the room, into the hot air flue, to supply it with cold atmospheric air.

In a note appended to the description, we are informed that "the hot air is let into the different rooms in the upper part of the house by means of apertures in the surbase of each room."

This description is certainly very meager, and we are uninformed in what the novelty consists, and how to conduct all the gastronomic operations to be performed. We think it bad management to

supply air from the kitchen, at all events in winter, when all the rooms require to be warmed. If the hot air flues have "not heretofore been known" to the patentee, he has lived out of the atmosphere of stove constructors, and heat distributors.

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16. For a *Thrashing Machine;* James Douglass and Walter Johnson, Attica, Genesee county, New York, May 14.

The beater is to be set with teeth, and the concave segment is likewise to have teeth on it. It is in fact altogether like Mr. Allen's, No. 12, excepting in the making the concave in separate pieces, as in this it is to be of one piece of cast iron.

The only thing which seems to be claimed is the making of some parts of the machine of cast, and others of wrought iron.

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17. For an improvement in the *Manufacture of Pasteboard, Band-box Paper, Bookbinders' Boards,* and all other kinds of brown paper; Isaac Sanderson, Milton, Norfolk county, Massachusetts, May 15.

This patent is taken for manufacturing the above named articles from salt meadow grass, of various kinds, first made into hay, and prepared by using lime water, potash, and train or spermaceti oil. The patentee does not, however, claim either the use, or the mode of using the foregoing articles, and says, "but what is claimed as a new invention, or discovery, by me, is the making of brown paper entirely, or chiefly, from salt hay boiled and prepared as aforesaid."

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18. For improvements on the *Piano Forte;* Charles P. Sakmeister, City of New York, May 17.

The improvements consist in "a *back catch*, applicable to the old action, (called the English action,) also in the construction and movement of the *hammer shank*, and a *front catch.*"

"The back catch is intended to prevent the hammer from vibrating, or rebounding back to the strings."

The action of the hammer, and indeed of all the parts, would require a drawing to make them clearly known; they are very well represented in that accompanying the specification. The claims are,

"*First.* The lever upon which is placed the back catch, placing the catch thereon, and the method of operating upon it."

"*Secondly.* The lever upon which is placed the front catch; the manner in which the front catch is made to act upon the hammer, by means of the lever aforesaid."

"*Thirdly.* The form of the hammer shank, or that part of it which is acted upon by the jack."

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19. For a new mode of *Using Horse Power by means of an endless Chain and Rail-way,* called "the Endless Chain and Rail-way Horse Power;" Samuel Lane, Hallowell, Kennebeck county, Maine, May 17.

Horses walking upon inclined floors, the pieces of which are linked together and form an endless chain, or floor, is a well known means of applying animal power; motion being communicated to machinery by one of the drums over which the endless floor passes. The floors are usually made of strips of wood, which, by the treading of the horse, soon wear down, and become so elastic as to consume much of the power applied to them. The mode in which they are sustained is also, in general, very defective. We think this invention of Mr. Lane a real improvement upon this apparatus; we are also informed that it has answered perfectly well in practice, and have no doubt of the correctness of the information.

The floor instead of being made of wood, is formed of round bar iron of seven-eighths of an inch in diameter, and twenty inches in length. The rods are placed about seven-eighths of an inch apart, which leaves the proper space for the cork of the horse's shoe. The iron rods are turned down to five-eighths of an inch at each end, and receive a true cast iron roller, to serve as a friction roller, leaving beyond this, sufficient length of the turned down part to serve as a gudgeon to couple the rods together, which is done by flat links of iron, forming an endless chain at each side; the outer ends of these gudgeons drop into notches on the head of one of the drums, to prevent slipping. A wooden rail, faced with iron, is placed under the rollers, at each side, and form a rail-way upon which they run.

The claim is to this mode of forming the floor of iron rods, and the attaching the rollers in the way described, to run upon the rail-way, with the mode of connecting them.

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20. For an improvement in the *Bedstead as inclosed within, or attached to Presses, Bureaus, Sofas,* &c. denominated the "Secret Bedstead;" Williams Wooley, City of New York, May 17.

The bedstead above named is made to fold up in a manner which resembles the leaves of a common dining table, supposing the table inverted. The sacking bottom is fastened to two strips which drop into notches, or mortises, in the frame. The bottom part of the bedstead is upon castors, or rollers, upon which it is run out of the press when the doors are opened. Two levers, one at each end of the press, connect the bedstead and press together, one end being attached to the press, and the other to the bedstead, by pins, so as to form a joint.

The specification does not state in what the improvement consists, but merely describes the whole bedstead, without any claim: if the patent can be sustained, therefore, it must be limited to the particular arrangement of the parts as specified.

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21. For the construction of a *Vessel to be Propelled by Steam,* called the "Fin Steam Vessel;" Antoine Batby, City of New York, May 18.

This boat is to be propelled by buckets, or fins, which work en-

tirely under the water. There is on each side of the keel a slider working in grooves, to which the buckets, or fins, are attached, like hinged shutters, they being intended to close and open, as the slider passes alternately backwards and forwards. The sliders may be each twenty feet long; the grooves in which they slide, forty, in order to allow them to have a stroke of twenty feet. To each of the slides a rack is attached, which being operated upon by a wheel working through a water-tight casing, leaving an opening from the deck to the bottom of the vessel, is moved alternately backward and forward, twenty feet; its gearing with the piston of the steam engine producing this motion. The cylinder, we presume, lies horizontally on the deck, and its piston rod is a rack, which takes into a pinion upon a shaft, carrying two large toothed wheels, driving those which operate upon the racks of the sliders.

The buckets, or fins, are each eight feet long, and four feet wide, at the widest part; they are made fin-shaped, which, if we understand the description correctly, reduces them to 19 square feet of surface each. The patentee says he borrowed the idea of the *form* of the propellers from the fins of fishes; this, however, is a fancied analogy, as the fins of fishes are not propellers, but rudders, the fish swimming by the sculling motion of the tail. If his propellers are good in any form, they would be better left square, than rounded off.

The fins, it appears, are to hang loosely, and to be opened and closed by the action of the water.

The claim is to "the fins, the sliders, their casements, and the part of the machinery used to connect the sliders with the piston rod of the steam engine."

We do not see in what respect this alternating motion of the paddles is to surpass in effect the many attempts which have been made to obtain a continued direct motion by endless chains, to which the paddles have been attached. The amount which will be lost in the friction of the racks and pinions, and the resistance of the slides and their appendages in the return stroke, will abstract greatly from the effect of the power applied, and, we have no doubt, will reduce the value of this mode of propelling below that of the ordinary wheel.

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22. For a *Thrashing Machine;* Samuel Fisher and David Sperry, Botetourt county, Virginia, May 19.

A cylinder with beaters, and teeth, and a concave with corresponding teeth, form the essential parts of this *new* thrashing machine. The spikes, or teeth, however, are to be fluted on their ends and sides, and this, we are told, is its distinguishing feature, "in consequence of which the grain is beat, and rubbed off, at the same time, with much greater ease than if they were not fluted."

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23. For an improvement in the *Mode of Applying the Common Flyer for Spinning and Twisting*, denominated the "Universal Spinner;" John Brown, Providence, Rhode Island, May 20.

The spindle in the improved mode proposed, has a bearing at each end, and an aperture at top, for the thread to pass through, similar to that in the common flax wheel spindle. The bobbin has a positive motion given by a whirl at its bottom; the flyer is attached to the upper part of the spindle, and this latter passes through a tube made fast in the waive rail, or lifter, on the throstle frame; it runs quite freely in this tube, being subjected as little as possible to any obstruction, excepting that of the draught of the thread, which is attached to the flyer in the usual way. To regulate the draught with the necessary precision, the lower end of the spindle passes through a notch in a piece of leather, to which a weight may be attached.

"The band which gives motion passes from the cylinder in the frame, to a whirl under the bobbin, on said tube, instead of passing to a whirl on the spindle; neither the whirl nor the bobbin having any connexion with the spindle, excepting in causing the revolution of the flyer and spindle, by the aid of the thread; the flyer being fast is conveniently lifted from its place, with the spindle, for doffing, &c."

There is a fast whirl on the tube, on to which the band may be dropped, and from which it may be raised, by a touch of the finger, when piecing is to be effected.

The claim is to "the peculiar application of the flyer and bobbin, as above."

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24. For an improvement in the *Art of Distilling Whiskey*, or other spirituous liquors, by steam; William Berkley, Lebanon, Washington county, Kentucky, May 20.

The arrangement of the pipes and tubs in this apparatus, scarcely admit of mere verbal description; the object proposed to be attained is great economy in the operation. The plan is well represented in the drawing, but the description is general, no claim being made, and we cannot, therefore, tell precisely for what the patent is taken.

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25. For a machine for *Jointing Staves for Barrels, &c.;* Charles B. Goodrich, Rutland, Worcester county, Massachusetts, May 20.

We are ready to employ the same terms in expressing our opinion of this machine, which we used respecting that (No. 10,) invented by the same gentleman for dressing staves.

A knife, or shave, equal in length to the stave to be jointed, is fixed across a frame of wood, made like that of the saw frame in the common saw mill, and worked up and down by a crank and pitman in the same way. The shave is to be made about three-eighths of an inch thick, and two inches wide; it is not straight on its cutting edge, the middle part being the lowest, and the edges rising each way, so as to give it something of a V shape, the angle, however, being a very obtuse one; the consequence of this, is, that as the shave cuts the edge of the stave, it operates diagonally upon every part of

it. In order to give the bulge to the stave, the face of the knife must be hollow, or concave; it receives this form by being drawn back by a bolt which passes through its centre, and which may be tightened by means of a screw and nut acting upon a block attached to the frame, and behind the knife; any desired curvature may be thus attained.

The stave to be jointed is held down upon a head block, upon a carriage in front of the shave. This head block forms such an angle with the shave, as may be necessary to give the stave the proper cant, according to the size of the intended vessel. The stave is made to advance slowly, that the shave may not cut too rank, but take shavings of a suitable thickness. A small saw, attached to the frame, divides the shavings in the middle as they are cut off, by which means they readily clear themselves.

The claim is to "the application of a shave, or knife, similar in shape to the one above described, to the jointing of staves for bulging casks."

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26. For a *Fountain Pen, for Writing with;* D. W. Hyde, Reading, Berks county, Pennsylvania, May 20.

Imagine a common old fashioned pencil case, containing a small tube, instead of a black lead pencil; let this tube be open at both ends, the lower end terminating in a point, like a cut pencil, with a slit admitting ink to flow through it. Fill the tube with ink, place a cork in the upper opening, and you have the whole establishment.

Fountain pens have been frequently made, but usually much less *simple* than that now offered. If carried in the pocket, it ought to be in that of a black man, with a black dress, as, in this case, it will produce but little change either in the colour of the skin or of the clothes. Whenever the tube is warmed, the expansion of the air will force the ink out; and when it is cooled, the ink will retire from the point, and refuse to run.

The claim to "*invention*, is the before described fountain pen."

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27. For an improvement in the *Production of Artificial Light*, in the burning of tallow, oil, or other fatty substances; Isaiah Jennings, City of New York, May 20.

(See specification.)

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28. For machines for *Breaking and Dressing Hemp and Flax;* John Rich, jr. Troy, New York, May 20.

Two fluted rollers standing horizontally are placed as near as may be to each other, a third roller stands centrically over the two, and meshes into each of them. The gudgeons of this third roller are placed in weighted blocks, which have a vertical motion. The flax, &c. to be broken is passed backwards and forwards, between these rollers, until it is sufficiently broken. For this purpose the lower rollers have toothed wheels upon their ends. A rack, worked

backwards and forwards by a crank and pitman, or otherwise, takes into these teeth; the vibration is to be to such extent as shall carry the fibres each way, their whole length. As it passes out from the rollers it is received at each side upon endless aprons, which sustain it, and have the same vibratory motion with the flax itself. This is given to them by gearing the inner rollers which support them to the toothed wheels on the breaking rollers.

The endless aprons are formed of narrow slats of wood, properly connected by ropes, straps, or otherwise.

The dressing machine is formed, in part, of an endless apron, placed so as to make an angle of about forty degrees with the horizon; it is composed of slats of wood, like the former; these slats have projecting pins, properly arranged; the material to be dressed is held in, and managed by, the hand; the apron being moved in a descending direction, the pins act upon the fibres.

"The improvements which I specially claim, and which are considered as original in myself, being,

"The principle as well as the manner of effecting the reverberatory, or vibrating motion, and the process of [passing] the hemp and flax through between the breaking rollers, by which it is made to pass backwards and forwards between them, until sufficiently broken, without the necessity of re-handling;—together with the aprons therewith connected, and the motion corresponding with the rollers there given to them."

"Also the whole of the apparatus for dressing and cleaning the hemp and flax of the shives, or woody part; and especially the manner of constructing the revolving aprons, as before described, and using and applying them to common, or other carding machines of wool, or cotton, or wherever revolving aprons are required."

"Together with the machinery as connected with the said improvements, and the principles embraced therein, or whereby like processes, operations, and effects, are to be produced. And generally all such other improvements in this specification mentioned, and not thus specially designated, as are original in themselves, or become so by reason of the particular application or combination therein given to them, and which shall be found not to interfere with any improvements heretofore known or used."

With the exception of the claims, we have given a very condensed epitome of the description of this machinery. The specification is written with much ability, giving a full, and remarkably clear description of the whole. The claims also, so far as they are contained in the two first paragraphs, are very distinctly made; those in the last we view as altogether redundant; we do not suppose that there is any thing contained in them calculated to vitiate a patent, but that, in a court of law, they would be considered as mere surplussage. If any thing can be claimed in a manner so vague, every thing may, and the part which precedes it would be useless. It is the business of the patentee to tell distinctly what he patents, and not to say that there is, or may be something else which is new, and which he has invented without knowing it, and should any one find out what this

is, he is hereby forewarned not to use it. Upon examining the terms of the law it will be found to exact something very different from this.

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29. For a "*Double Pendulum Corn Mill;*" M. B. Poitiaud, Richmond, Virginia, May 20.

We might very well place this invention among our *Modern Antiques*, for although we cannot say that it has been long known and used, we may aver that this "new and useful mode of working wheel machinery," has been long invented, frequently tried, and uniformly abandoned. No scientific machinist would for a moment think of using the pendulum as a motive power, any more than he would of constructing a perpetual motion. Give us the one, and the other is discovered.

Mr. Poitiaud uses the pendulum as a motive power to drive mill stones. The pendulum is to operate upon ratchet wheels placed on the mill stone shaft; their operation is to be such as shall propel it in the same direction by the backward and forward vibration; this kind of motion is well known to mechanicians, and need not be described. There is also a fly wheel upon the shaft, which is not only to regulate, but "add some to the power." Two men are to work the mill stones. The patentee, we are informed, is actually constructing a mill, to manifest the correctness of his principles. We hope the cost of it will not be a consideration of any importance to him, as he certainly will never be remunerated by its profits.

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30. For an improvement in *Street Pumps*, to prevent persons from throwing stones, or other hard articles into the same; Martin Mettee, Baltimore, Maryland, May 20.

A patent was taken out in September last, by Mr. J. W. Hillias, of Baltimore, with the same view as the above; it is noticed at page 410, vol. iv. new series. The present patentee uses a cast iron box for the gudgeons of his pump handle to work in. The short end of the lever, which is attached to the piston rod, is not in a line with the handle, or long end, and the mortise or slot, in which the handle works, does not, therefore, pass through to the inside of the body of the pump. The nozzle is to be of cast iron, with a flanch, to attach it to the pump by means of screws; it is also to be formed with an elbow, and to have two half diaphragms, or partitions, within it, at a distance from each other, to prevent the introduction of stones, &c. There is no claim.

Most of the pumps in the city of Washington are without a mortise for the handle. The pin upon which it works comes through on one side, and the handle is there attached to it, answering every purpose of the complex contrivance proposed by the patentee. A handle might be made and inserted in the common way, by merely enlarging the part which surrounds the fulcrum, so that it might form a circle of four inches in diameter; it might then be so inserted

into the pump tree, as not to leave any opening into the bore of the pump.

[TO BE CONTINUED.]

SPECIFICATIONS OF AMERICAN PATENTS.

Specification of a patent for an improvement in the Percussion Lock for Guns, called the "Concealed Percussion Gun Lock." Granted to JOEL NEWBURY, Poughkeepsie, Dutchess county, New York, April 27th, 1830.

THIS improvement, and the manner of using it, are as follows:—

The whole lock consists of a main spring and feather spring, a cocking and discharging trigger, and a sear, or dog, kept in their places by three screws and a pin.

The lock rests upon the trigger plate attached to the guard, and when fixed upon the gun for use, is let into the under side of the stock, by which it is so far concealed as to present the appearance of a common gun with two triggers protected by a guard, but without any lock.

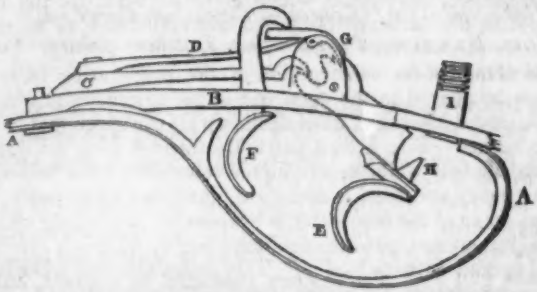
The main spring is immediately above the trigger plate, and the feather spring immediately above that, and both are attached to the trigger plate at the but, or end of the springs nearest the gun breach, by a screw passing through both, which, by screwing tight, stiffens the springs, or, by partially unscrewing, relaxes them; these springs are both protected and kept in place at the forward end by two semicircular flanches attached to the upper edge of the trigger plate. Between the flanches are fastened, by a screw passing through each, the cocking, or forward trigger, and the sear, or dog.

The cocking, or forward trigger, plays through the trigger plate, and its office is to supply the place of the common gun cock, and is operated on by the main spring; the forward end of which plays into the cocking trigger between the flanches in the same manner as the main spring of the common gun lock plays into the tumbler.

When this forward, or cocking trigger, is pulled, the forward end of it comes down towards the bow of the trigger guard, and is set in the same manner and on the same principle as the common gun cock, by the sear, or dog, operated on by the feather spring which presses the forward end or point of the sear, or dog, into a notch or notches made for that purpose in the sear and circular end of the cocking trigger, on its upper edge. At the forward end of the cocking trigger, on its upper side, is to be either a hammer to strike on a percussion cap, or, instead of a hammer, there is to be a bill, or cone, to strike upon a kernel of percussion or fulminating powder, placed in the mouth of a tube passing through the trigger plate, stock and gun barrel, on the under side, and communicating with the charge of powder at the breach pin in the same manner as through the common tube or touch hole. This cocking trigger, which answers to the common gun cock, is unbent or discharged by the dis-

charging trigger, in the same manner, in every respect, as the cock of the common gun lock, by the discharging trigger operating on the sear, or dog, which, by pressure, is disengaged from the notch in the cocking trigger. The cocking trigger may be either within or forward of the trigger guard, or playing through a slit cut for the purpose in the forward part of the guard. The same principle is intended to be applied to pistols and to double barrelled guns.

JOEL NEWBURY.



A, guard. B, trigger plate. C, main spring. D, feather spring. E, cocking trigger. F, discharging trigger. G, sear, or dog. H, bill, or cone. I, tube which screws into the touch hole.

Specification of a patent for an improvement in the art of making Glue, by evaporating the water commonly called the foot water, or the liquor after boiling the bones of all kinds of animals, to a proper consistence for cutting, drying, and making into Glue, by means of a double floored evaporating basin. Granted to PETER COOPER, *City of New York, April 29th,* 1830.

THIS improvement consists in having an ordinary furnace made of brick work; from this runs a horizontal chimney or flue half the width, and running the whole length, on which it is intended to construct the evaporating basin, it is then returned on the other side back to the furnace where the flue terminates in a perpendicular chimney. Across these two flues are to be laid at proper distances, iron bars of about an inch in breadth, to support the lower basin; upon these is laid one extended sheet of lead, or other metallic substance, and upon the edge of this is placed a wooden curb from six to twelve inches deep. To the outside of this wooden curb the sheet of lead is to be nailed all round, and so as to be water tight.

Upon the bottom of this basin are laid three or four longitudinal strips of boards about two or three inches in width, and terminating about a foot short of the inside of the curb at the end furthermost from the furnace. Across these, and about an inch, or an inch and

a half apart, are slats of about an inch thick, and an inch high, and nailed to the longitudinal strips on which they rest.

At the point where the longitudinal strips terminate, at the far end of the curb, and about one foot from it, is a piece of *board* going across the basin and grooved to the inside of the wooden curb aforesaid, this board is to be constructed about half an inch higher than the surrounding curb, and about two inches less in depth.

Upon these slats is another sheet of lead extended, or other metallic substance, the edge of which is to be bent up, and nailed to the inside of the curb and the board aforesaid, and so as to be impervious to the water.

This completes the construction of the evaporating basin; water is now to be poured in the open end of the lower basin, which is beyond the board aforesaid, until it fills up all the space that is between the two basins. Fire is then put to the furnace until the water boils, and then the foot water or the liquor remaining after boiling the oil from the bones and feet, is to be run into the upper basin, and the fire kept up until the foot water is evaporated to a proper consistence to be taken out and put into cooling troughs, where it afterwards is cut and spread on nets to dry. This completes the process.

The improvement for which your petitioner claims an exclusive right, is the construction of the double floored evaporating basin, and the application of it to the purposes of making glue, described as aforesaid, whereby the foot water, or liquor after boiling the bones of all kinds of animals, is evaporated into a proper consistence to preserve it, and make it into glue. PETER COOPER.

Specification of a patent for an improvement in that part of the Ingrain Carpet Loom, which is called the Engine. Granted to JOSIAH R. CLARK, *South Coventry, Tolland county, Connecticut, May 7th,* 1830.

THIS improvement consists in substituting a rotary sheet of pasteboard, parchment, painted canvass, or any other suitable substance, perforated with holes in such a manner as to form the figure required, in lieu of the barrel or cylinder with wire cogs, or staples, set in it, (somewhat resembling the barrel of a hand organ) which is commonly used; and also as a substitute for, and an improvement on "the Jay Card Machine," so called, or as it is sometimes called, "the Paper Machine;" and also as an improvement on the canvass apron with cogs or strips of wood attached to it, and with staples set in these cogs, which has been recently brought into use. The sheet of pasteboard, &c. required, will be of various size, according to the design of the figure to be laid out upon it, but always of a breadth about equal to the length of the cylinders, or cylinder, around which the sheet is to operate, and on this sheet is to be laid out the design for the figures to be woven by it in the same manner as the surface of the cylinder, or barrel, is usually laid out for the setting of the wire

cogs, or staples; and in every place where a wire cog would be set in the cylinder, punch, or cut, a fair hole through the pasteboard; and all these holes in equi-distant lines across the pasteboard; and besides the holes which are laid out to form the figure, punch other holes near each edge of the pasteboard in about every second or third line of the figure holes. This sheet, being thus prepared, may be conveniently applied and used in the following manner, viz. place a small cylinder of any convenient diameter, and of such length as the work requires, say from twenty-one to thirty-eight inches long, in the same place, or nearly in the same place of the large barrel, or cylinder, commonly used; this small cylinder is to be fluted, or grooved, from end to end, with grooves about half an inch deep, and just as near together as the lines of holes across the pasteboard are; in every second or third groove, near each end of the cylinder, drive a pin of wire having a blunt point rising somewhat above the surface of the cylinder, and standing in right lines around it, like spur cogs, and exactly corresponding with the edge holes in the pasteboard. At a suitable distance behind this fluted cylinder, and parallel to it, place another plain cylinder; around both these cylinders wrap the sheet of pasteboard, and lace, or tack, the two ends together, or as nearly together as may be, in the manner of a rotary apron, or creeper, the rows of holes in the edges of which suit to the rows of pins in the fluted cylinder, and by which it is regularly moved forward and backward, in the same manner, and by similar machinery, to that which is in common use.

In all "pointed," or "gathered" patterns, it is best to move the apron forward for the first half of the figure, and backwards for the reverse half; but in all "sprig," or "cumber" patterns, it is best to move the apron perpetually forward, in the same manner as is known and practised by all carpet weavers.

In the barrel, or cylinder, engine, the pins or staples are so arranged, that the wire slides, commonly called "levers," which govern the threads of the warp, slide towards the cylinder at every "hard," or double throw of the shuttle, and a part of these slides, or levers, meeting with the pins, are obstructed in their course towards the centre of the barrel, and the number thus obstructed determines the number of threads of warp which shall be thrown over the surface of the web, from time to time, as the weaving progresses, to form the figures; and a cylinder, or barrel, with pins differently arranged, is requisite for each differently figured pattern. But this improvement is different, in that the levers, or slides, which meet with the holes through the foster-board, are permitted to pass inward by entering into the grooves in the smaller cylinder, and so determine the number and arrangement of the threads of the warp which shall be thrown upon the surface to constitute the figures.

There are, however, not only several different substances which may answer nearly as well as pasteboard, but also several different arrangements not differing essentially from that more particularly described; especially, that instead of having the perforated apron pass round two cylinders in an elliptical form, as before described,

it may be bound fast upon the surface of a large cylinder, grooved as aforesaid; the grooves being just as far apart as the rows or lines of holes in the apron; but in this arrangement there will be no need of so many holes at the edges as in the former case; and this cylinder may take the same place, and be moved by the same machinery, and in the same manner, as the common barrel with pins in it is moved. In this arrangement, as well as the foregoing, the same cylinder continues always on the engine, and the coverings only are changed to operate all the variety of patterns.

In fine, the only things which I claim as improvements are the rotary apron perforated so as to form the figure (upon principles already in use) as being much cheaper, more simple, more sure to be in order, more easily shifted, and requiring less attention in foremanship, than the barrel with pins, or staples, the canvass with staples, or any other method of forming the figures in carpet engines now in use; and also the fluted, or grooved cylinder, upon which the perforated apron operates.

JOSIAH R. CLARK.

Specification of a patent for an improvement in the mode of preparing Paddy, or Rough Rice, suitable for culinary purposes. Granted to JOHN L. NORTON, *of the City of New York, at present residing in Charleston, South Carolina, May 7th,* 1830.

THE paddy, or rough rice, after having been sifted through a screen of wire cloth to separate it from the defective light rice and dust, or sand, descends, or is conveyed to a pair of mill stones, for the purpose of shelling, or removing the external hull, or shell; from the stone the rice passes a wind fan, to separate the chaff, or outer husk, from the shelled rice, which is next to be conveyed to a screen of wire cloth, of two degrees of fineness, the finest part being at the most elevated end, is adapted to let out the dust, or sand, and the lower, or coarser part, to allow the shelled rice to pass through; and such grains as may have escaped from the stones without being shelled, will not pass through this wire cloth, but be delivered at its lower end to be passed again to the stones. The process so far described, has been known and used for a long period of time, and I distinctly disclaim all exclusive privilege to the use of any part, or parts, of the foregoing process.

But rice has also an internal pellicle, or skin, which, although very thin, requires to be removed before it is fit for culinary use, and which is not effected by the previous operation of the stones or screens. The following is a full and exact description of my improvement.

The internal pellicle, or skin, I rub off, and remove by triturating, or rubbing the shelled rice between a mill stone, commonly called the bed stone, and a runner (made of wood, or other substance,) faced with sheep skin, (with the wool on) or any other elastic substance, which presses the rice close against the bed stone, not so hard as to break the rice, but sufficiently so to cause the grain to be

rubbed with a rapid motion against the stone, which takes off the extraneous substance from most of the grains, leaving the pearly substance of the grain bright and clear; this process is to be repeated, and the quality, or state of the rice, may be such as to require it to be passed through the machine three or more times, and to be screened and fanned between each operation. The rice is then, in the ordinary manner, to pass through screens, or fans, to the spout which delivers it into the barrel.

The application of this invention may be varied by making the runners of stone, and the bed stone, (if I may so call it,) of wood, or other substance, faced with sheep skin, (with the wool on) or any other elastic substance, which will press, and keep the rice in close contact with the stone.

The bed stone and runner, which I have used, are six feet in diameter, and move at the rate of 120 revolutions per minute, though I do not limit myself to any particular dimensions or speed, but I have found these to answer my purpose. JOHN L. NORTON.

Specification of a patent for a machine, denominated the "Facilitator," for the Napping of Hats. Granted to A. P. GREGORY, *Ithaca, Tompkins county, New York, May 13th,* 1830.

THE *Facilitator,* or napping machine, is so constructed as to combine all the requisite properties of hand labour in making the nap penetrate the bodies of the hats, which are, *motion, pressure, heat* and *wet.* The hats are prepared in the usual way, by first sticking on the naps; they are then rolled up singly in the same way that they are rolled to work by hand (omitting the cloth that they are usually rolled in) and put into the machine while wet and hot, the machine standing on the plank kettle, the bottom resting on the rim of the same.

The *Facilitator* is constructed as follows, and may be proportioned in size to the work intended to be done. For a machine which will carry 18 hats, or under, it should be 18 inches square at bottom, and 26 inches in height. The machine from the bottom, up, 13 inches, is divided into two equal parts, by an inch board, which is introduced at the bottom, and secured by nails passing through the sides of the machine, and into the ends of the board. Three inches above the upper edge of this board, which is 16 inches from the bottom, hangs a wooden shaft, ranging with the board below, on an axis one inch in diameter, to one end of which is attached a crank one foot in length. Through this shaft, and two inches from each side of the box, are two arms 17 inches in length; on the ends of the arms are two pieces of wood, one inch square and 15½ inches long; the shaft, arms and pieces on the ends of the arms, forming a frame which may be represented by two parallel lines, 17 inches long and 12 inches apart, for the arms; and at the extremities of these arms, two other parallel lines, 15½ inches long, forming right angles with the two

first lines. Then draw a line across the two longest equi-distant from the ends, which represents the shaft, to one end of which the crank is attached.

When in operation, the crank is moved by a vibrating motion, similar to the pendulum of a clock, with the exception that its vibration is longer, say about 170 degrees, and about as frequent as a time piece which beats half seconds. To the extremities of the arms, on the pieces of wood one inch in diameter, is fastened, by small tacks, a piece of coarse woollen cloth (lion skin) 1½ yards long, and 16 inches wide; the middle resting on the upper edge of the board by which the box is divided into two equal parts, to the edge of which it is fastened by nails, and hanging down into each apartment in the form of bags, into which the hats are put, through a door made for the purpose on the side of the machine opposite to the crank. By giving motion to the crank, the ends of the cloth being attached to the extremities of the arms, gives a rolling motion to the hats, and at every motion the bags with the hats go so low as to touch the water in the kettle, which keeps them sufficiently wet, and the machine confining the steam, keeps them much hotter than they can be worked by hand. It is necessary to take out the hats at the first as often as once in about 4 or 5 minutes to open them, or (to use a hatter's phrase) to crose them, to prevent the naps from running together; but towards the last, they may run twice that time. Hats may be sufficiently scalded in from 1 to 1½ hours, according to the stock used and the number of hats worked at once. When as few as four hats are worked at one time, they should all be put into one side, but when more than 4 are worked, there should be as many put in one side as in the other. The top of the machine forms a half circle, the axis of the shaft being the centre. It is made separate from the bottom part, and attached to it by a pair of buts on the side of the machine opposite to the crank, and a small hook with two dowels on the side of the crank.

A. P. GREGORY.

Fig. 1.

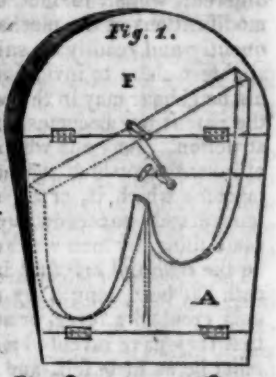
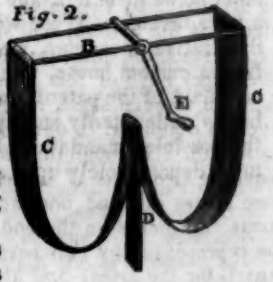


Fig. 2.



A, (Fig. 1,) tight wooden box.

B, (Fig. 2,) a frame placed across the box, supporting the cloth C.

C, a cloth of woollen, fastened to the arms of the frame B; the middle of which is nailed to

D, a perpendicular board reaching across the middle of the box, and making two apartments therein.

E, a crank, by which the frame B is made to have a vibrating motion; this is shown in dotted lines, in Fig. 1, as is also

the vibrating frame with its cloth, &c., the former being at the back, and the latter within the box.

F, (Fig. 1,) the circular top of the box, with its hinges.

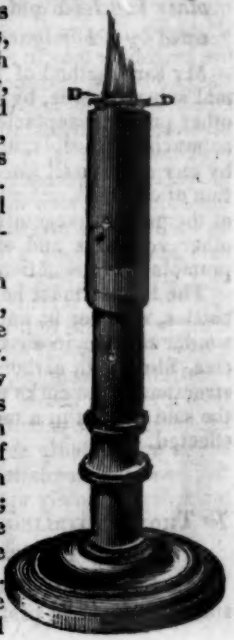
Remarks by the Editor.—This machine differs *in form*, from two others previously patented, one of which was noticed in our last number, as having issued on the 26th of April, to Mr. George Henning, and the other at p. 31 of our last volume, as patented by Mr. D. Baldwin. The resemblance between those of Baldwin and Henning would, we think, be apparent to any one, and, to us, it really appears that this of Mr. Gregory, is the same in principle; we have witnessed decisions in court establishing the identity of two machines which differed much more in the arrangement of their parts than do either of those now before us. There is one circumstance worthy of notice, namely, that all these three patentees are inhabitants of the same town, and the machines afford *prima facie* evidence of a common origin. Under such circumstances it is certain, that the only security which the patent law can afford to inventors must be derived from their claims being liberally viewed, and rigidly sustained by our courts of law. There are but few machines of any considerable complexity which we would not undertake so to modify and distort, that, to all common observers, they should appear to be essentially different, whilst, in fact, they remained essentially the same. The modifications of the mechanical powers are numerous; one may frequently and readily be substituted for another, without affording the slightest claim to invention. If after a man has devised a machine, his neighbour may in this way rob him of his just dues with impunity, the patent law becomes a mere false light, to allure men to their destruction. Any one who has paid the strict attention to the progress of inventions which we have done, is well aware that whenever a machine which is, or appears likely to be, useful, is patented, it is immediately succeeded by numerous patents for modifications of the same thing, by men who *swear* that they really believe themselves to be the *true* and *original* inventors or discoverers. A custom house oath has been long a by-word, but really when persons who have only crooked a lever, or substituted a screw for a wedge, will swear that they have invented a machine, the sacredness of the averment must be as little felt, and its fallacy as palpable, as the testifying to a false invoice. Were we at liberty to do so, we could furnish some illustrative anecdotes, which might go far to change the reference from a custom house, to a patent office oath. Inventors frequently complain of the patent law, as affording them no security; the patent law is undoubtedly susceptible of much improvement, but after all the possible emendations have been made in this statute, its value must depend solely upon an enlightened jurisprudence.

Specification of a patent for an improvement in the production of Artificial Light, in the burning of tallow, or oil, and other fatty substances. Granted to ISAIAH JENNINGS, *City of New York, May 20th,* 1830.

To all whom it may concern, be it known, that I, Isaiah Jennings, of the city of New York, have invented certain improvements in the production of artificial light, both in the burning of tallow and oil, and others kinds of fatty substances, which improvements consist in part in the mode in which tallow, or other suitable substances may be formed into candles, and in part in the structure of the apparatus in which they, or other fatty substances, are burned, and that the following is a full and exact description of the same.

1st. When hard fat is to be burned, I form it into a candle, which I usually make of about two inches in diameter, and from four to twelve inches in length; these are made by casting the fat into a mould; the wicks are made flat, and about one inch and a quarter wide. These I usually make of cotton cloth, folded so as to give to the wick the desired thickness; it is cast in the tallow in the usual way.

A suitable stand, to be used as a candlestick, is prepared to receive this candle; the upper part of this stand (C,) is made cylindrical, and about the same diameter and length as the candle; the length, however, may be varied considerably. A glass tube (A,) is prepared, which is open at both ends, usually about nine inches long, and of such diameter as will allow the candle to slide freely, though tightly, in it. When the candle is placed upon the stand, or candlestick, above described, the tube is slid over it, until its upper edge is nearly on a level with the top of the candle. This glass tube is made capable of being passed down over the cylindrical part of the candlestick, as the candle burns away.



A strip of brass, or other substance, which I call a wick hold, (D,) is passed over the wick, (B,) in order to prevent its burning below the edge of the glass tube, and also the cylinder. The wick holder is of such a length as to allow its ends to reach across, and rest upon the glass tube; it has a slot, or mortise, of sufficient length and width to pass over the wick. The ends of the wick holder may be notched so as to form checks to retain it in its place upon the tube; or two or more flat or round wicks may be placed near the outer edge of the cylinder, the wick holders being so formed as to correspond.

A candle of this description will burn a whole evening without requiring to be snuffed, and

may be decreased in length about one and a half inches. The glass tube may be then slipped down, the wick cut to a suitable length above the wick holder, and the candle relighted.

Soft grease or oil may be burned in a tube of this description, by having hard tallow at the lower part, or by making it tight with some other substance; or cork, or other elastic substance, may be used for the same purpose, pouring the grease or oil in above it, and allowing the wick to hang loosely from the wick holder within it; as it burns down it may be replenished, or the tube slid down as before.

A candle of the above kind may be made of any desired length or diameter; it may, for example, be two feet in length, and the glass tube need not be more than four inches. The tube may also be made of earthenware, or of any bad conductor of heat; a good conductor would melt the tallow throughout the whole length.

A glass burner may be placed over the flame if desired.

What I claim as new in the foregoing, is the glass, or other tube, that is a bad conductor, sliding over the candle, in the manner, and for the purposes described. ISAIAH JENNINGS.

ENGLISH PATENTS.

To DONALD CURRIE, *Esq. for a method of preserving Grain and other Vegetable and Animal Substances and Liquids. Communicated by a Foreigner.* Dated January 31, 1828.

MY said method of preserving grain and other vegetable and animal substances, is, by inclosing them in air tight vessels, vaults, or other proper receptacles, from which I extract the atmospheric air as much as possible, and replace it with carbonic acid gas, procured by any of the well known methods; as, for instance, by the combustion of charcoal, or by fermentation; and thus I prevent the tendency of the grain to vegetate, and greatly hinder the decomposition of the other vegetable and animal matters which is ordinarily so greatly promoted by the action of the oxygen contained in atmospheric air.

The liquids must be put into tightly corked, or otherwise closed bottles, or other fit and proper vessels, and be then inclosed in a similar manner in air tight vessels, vaults, or other proper receptacles, filled with carbonic acid gas, which will hinder the usual destruction of the corks or other closures, and consequently, preserve the said liquids in a more complete manner than has hitherto been effected. [*Rep. Pat. Inven.*

To THOMAS STIRLING, *Slater, for improvements on Filtering Apparatus.* Dated August 16, 1828.

MR. STIRLING'S filtering apparatus consists of a vessel of considerable depth in proportion to its other dimensions (as represented

in the drawing) divided into five compartments horizontally, (of from six to twelve inches or more in height, according to the size of the vessel,) by four diaphragms, or transverse partitions, the lower one of which is perforated for a space of about six inches square in its middle, with several holes, small below and enlarged conically upwards; over these holes a piece of wire gauze is to be placed, and above that another diaphragm or plate, having an opening six inches square in its middle, is to be cemented to the former. The second transverse partition differs only from the first, in having the conical holes bored near its sides, instead of in its middle; but the third is again formed like the first in this respect; while the fourth, or upper one, is perforated in all parts indiscriminately.

The lower compartment is occupied solely by the water to be filtered, which is conveyed into it by a pipe screwed into its side, which turns up outside, at a height proportioned to the force with which it is desired that the water shall pass upwards through the filter. The second compartment is filled with fine river sand: the third with the same material mixed with carbonaceous matter, or with a species of sand procured from the River Carron in Scotland; and the fourth with bits of "*scoriæ*," from the Carron founderies, broken so as to be from one-eighth to one-quarter of an inch in diameter; while the fifth, or upper compartment, is occupied by the pure filtered water that has passed through those different beds of materials.

The vertical pipe is furnished with a cock, where it enters the lower compartment; another cock is also placed in the bottom of the latter, to discharge the impurities left there by the ascending water, and a screw plug is inserted in the side of the same, to close an aperture, through which a brush on a wire handle, such as is used for cleaning bottles, may be introduced to detach sediment from the internal surfaces of the compartment, when required to be purified; at which time water may be let to run in from the pipe to assist the operation. A third cock, placed in the side of the upper compartment, to deliver the pure water when required, completes the apparatus.

The patentee recommends the use of slabs of slate for the formation of vessels for filtering, when of a moderate size, of which two pieces are to be grooved at the edges to receive those of two other pieces to form the sides; all of these are grooved near their lower edges to receive a horizontal piece that forms the bottom, which with the rest constitutes the vessel. The transverse partitions are supported by upright pieces placed close to the sides of the vessel, and are cemented at their edges to them by mastic or other cement, to prevent the passage of water in any place but through the conical perforations; the edges of the bottom piece, and of the two plane sides, are also cemented to the grooves in which they are fitted; and the whole is kept together by horizontal screw bolts, furnished with nuts, that pass through parts of the side pieces, which project beyond their grooves.

When the filtering apparatus is to be of a very large size, the ves-

sel or cistern may be formed of iron plates, or of bricks or stones, united by water proof cement.

The use of having the conical holes placed at the edges of the second transverse partition, is, to cause the water to traverse a larger portion of the filtering materials in passing to them from those in the middle of the lower one, and from them to those in the middle of that next above them in position.

OBS.—We consider the general arrangement of this filtering apparatus to be commendable, particularly as regards the filtration by ascent, the provisions for cleansing the lower compartment, where the water enters, and the use of slate slabs for its cistern, when not of too large a size, as we consider this material to be as little liable as earthenware to defile the water. Stone slabs, however, have for several years been used in France for filtering vessels, which, perhaps, might have suggested to the patentee the employment of slate for this purpose.

We are not, however, quite so well satisfied of the advantages of the sand and broken scoriæ from Carron, recommended for filling the filtering compartments. If by scoriæ is meant, as we suppose, the dross that is removed from the surface of the pig iron when in fusion, it appears to us that the water would be liable to contract some flavour from the iron, which remains unvitrified in its composition, and that the sand would incur a similar objection; but should this be the case, the defect is easily remedied by substituting pure silecious sand and gravel for these materials.

It also appears to us, that the apparatus would be improved by having its transverse partitions so contrived as to be occasionally removed, in order to cleanse all the compartments and renew the filtering materials, that evidently must become foul after any considerably protracted employment. This alteration we think might be easily effected, and seems to us much preferable to cementing the edges of these partitions, as directed by the patentee, and which must of course preclude this displacement. [*Ib.*

To WILLIAM SHAND, *Esq. for a certain improvement or improvements in Distillation.* Dated August 10, 1829.

THE apparatus which constitutes these improvements is represented in the drawings of the specification, as consisting of three wooden vessels, or vats made of wood or other slow conductor of heat, through the side of the first of which, near the top, is introduced a pipe that communicates with, and is attached to, the beak of the still. This pipe widens at its lower end, and is placed like an inverted funnel over a small cavity formed at the bottom of the vat. A similar pipe passes from the first to the second vessel, and from that again to the third, and so on in succession, if more vats than three be employed; to the last, however, is attached a worm, which is immersed in a vessel of water, as in ordinary cases.

The bottoms of the vats are formed of wood, and have the cavity before noticed, cut in the centre somewhat larger than the funnel suspended over it; a plate of copper or other metal is fixed under them, furnished with cocks and pipes for conveying off the water with which the cavities are filled; the use of which latter will be presently explained. The tops of the vats are made of copper or other quick conductor of heat, and have domes formed in their centres; funnels furnished with cocks are placed near these for filling with water the cavities at the bottom of the vessels. Small pipes communicate with the lower part of each vessel in order to convey to the still the condensed vapours that have accumulated there; and in order to facilitate their passage, the bottoms of the vessels rise in gradations.

The patentee states, that in causing the vapour to pass through the water contained in the cavity, it will be divested of a portion of its empyreuma, and, consequently, a much more pure spirit will be obtained. In case, however, the strength of the spirit be a greater object than its purity, he directs the inverted funnels at the extremity of the pipes to be drawn above the liquid contained in the cavity. The tops of the vessels being formed of metal, the action of the atmosphere on the outside will be generally found sufficient to condense the aqueous vapour, while the alcoholic part passes on to the worm: should this fail to produce the desired effect, water is directed to be admitted on the top of the vats, the quantity and continuation of which is regulated according to circumstances.

A modification of this arrangement is described, in which the several vats are formed by an equal number of partitions placed perpendicularly in a square vessel, with the pipes arranged as in the former instance; but instead of placing water over the vessels for condensing the aqueous vapour, the wash intended for distillation is appropriated to that purpose, and is surrounded by a covering with a pipe leading to the still to prevent any vapour from escaping which might be formed by the heat of the copper domes.

Mr. Shand concludes the description of his invention, by stating it to be "applicable to the distillation of any fluid obtained by the evaporating of a gas or vapour, composed of gases or vapours, condensible at different temperatures." [*Ib.*

To THOMAS SALMON, *Malster, for an improved Malt-kiln.* Dated July 8, 1829.

THE object of this patent is to cause a portion of the heated air employed in the preparation of malt, to operate on the surface of the wet grain or green malt.

In the drawing accompanying the specification, the floor of an ordinary kiln is represented, formed of flat tiles with numerous perforations, and at equal distances from each other are placed three inverted funnels, which may be made either of tin, iron, bricks, or other materials that will bear heat; the lower extremities of these

funnels (which the patentee terms "*rarifiers*") are square, and each fits into a space formed by the removal of one of the perforated tiles: a slide passes through the upper part of the rarifier to regulate the admission of heat, and is directed to be so placed, that it shall be above the greatest quantity of grain that is prepared at one operation. When the wet grain is spread on the floor of the kiln, the slides of the rarifiers are withdrawn, and a portion of heated air passes upwards through the funnels and spreads itself throughout the chamber. The patentee states, that this method causes the malt to dry quicker, and that less steam is condensed on the roof. He concludes by recommending the aperture at the top of the kiln to be contracted to three feet, if the area of the floor be twenty-seven feet square, and in like proportion for other sizes. [*Ib.*

Account of a patent granted to David Lawrence *and* John Crundwell, *Gunmakers, for improvements in the Gun Locks for Fowling Pieces, and other Fire-arms, September 15th,* 1829.

This invention applies to locks on the percussion principle, and has for its objects, first, the protection of the percussion caps or powder, and the lock from injury; and, secondly, the prevention of accidental discharges of fowling pieces. To accomplish the first, all the parts of the lock except the tricker are placed within the stock in a recess which is covered by a protecting plate turning on a hinge at one end, and kept in its place by a spring-catch at the other: this plate is made to open for the introduction of the percussion powder or caps, which being shut in are perfectly secured from external injury. To prevent accidental discharges, these patentees employ a security pin, which fixes the tricker until it is released by the pressure of the hand against a small lever situated in the stock, and projecting about the sixteenth of an inch at the lower part where the left hand grasps in the act of firing. By this simple arrangement it is evident that no discharge can take place unless the pressure on the projecting lever, and on the tricker, be simultaneous, which renders an accidental discharge almost impossible.

[*Register of Arts.*

Account of a patent for improvements in the manufacture of Ropes and Cordage. Granted to George Harris, *Sept.* 15, 1829.

The specification first describes a new fluid composition discovered by the patentee, which he applies to cordage, canvass, and fibrous fabrics generally, with the view of preserving them from mildew, and increasing their durability; and, secondly, a new fibrous material, for the fabrication of cordage, canvass, &c., to which also is to be applied the new composition.

The basis of the composition is obtained from "certain plants, trees, and vines," called the Ficus Indicus, which grows on the coast

of Africa, and in the East and West Indies. At the proper season of the year, (the wet season) incisions are to be made in the bark of these trees, whence will exude a milky fluid, which is collected in suitable vessels, and afterwards exposed to a "boiling heat," which causes the "pernicious and aqueous particles to evaporate, and thereby prevent the liability of the remaining extract to ferment." Afterwards, there is to be mixed with it in a warm state, (from 80° to 100° temperature) "one gallon of cocoa-nut, palm, or other oil (not essential oil,) to every twenty-five gallons of the extract." In this state it is fit to be imported into this country, where, before it is used in saturating the substances before mentioned, there is to be mixed with the composition 1 lb. of bitumen, or "asphalt," to every 20 lbs. of the composition; and if this is not sufficiently liquid for certain purposes, then is to be added so much more of the before-mentioned oils as will bring it to the required consistency.

The plant from which the fibrous matter is obtained is also stated to be the native of Africa, and the East and West Indies, and is called the silk plant. The leaves of this plant are collected in the green state, then beaten by machinery (or other means) to separate the fibres from their husky envelopes. The fibres are then to be washed, dried, and sent to England. Here this new material is to be manufactured in a similar way to hemp and flax: the first process is called *hitchelling*, and the hitchelling instruments, instead of being oiled, are to be smeared with a portion of the new composition, and subsequently to the hitchelling, a further portion is to be rubbed over the fibres by hand. In the next process, that of spinning, the spinner is to be provided with a tin case, and a cloth saturated with the composition; in the former he is to dip his fingers, by which he delivers the fibres, and the saturated cloth which he holds in the other hand spreads the composition upon the yarn as it is formed. In all the subsequent steps of manufacturing the composition is applied, and the cordage so prepared is said to be much stronger and more durable than that of the ordinary kind.

The patentee describes also in his specification a peculiar method of forming the cordage for naval purposes, which, being wholly given in technical terms, would not be understood but by very few of our readers. It is also stated that canvass prepared in the yarn with this composition, does not require the usual sizing to lay the *haul*, which is considered to be detrimental to it; and that ordinary cordage prepared with it need not be twisted so hard as it is usually, by which its strength is impaired. [*Ib.*

Account of a patent for improvements in the concentrating of Cane Juice, solutions of Sugar, and other fluids. Granted to JOHN ATCHISON, *September* 15, 1829.

By Mr. Atchison's process, the evaporation is conducted in vacuo by the heat from steam. The cane juice or solution of sugar is placed in a semi-cylindrical copper pan, having flat semi-circular

ends; on the outside of which, about two inches apart, is another pan of a similar figure to the former, the space between them being used to contain steam as a medium for conveying heat to the saccharine fluid in the internal pan. The two vessels are secured together steam tight by flanches on their upper edges, which projecting outward, serve as points of support to the double vessel, which thereby rests on the upper side of a quadrangular iron frame, constructed as a stand for the reception of the whole apparatus. Inside of this double pan, is placed a cylindrical vessel, having likewise an external case, the space between the two being also used as a steam chamber for conveying heat to the matter under evaporation. This cylindrical drum is connected by means of radiating hollow arms to a centrical hollow axis placed in a horizontal position, on which the cylinder is made to revolve at any required speed, through the agency of toothed wheels situated externally. The revolving cylinder is of such dimensions with respect to the pan, as when placed within it, for the outside of the former to be about three inches from the inside of the latter. The steam is received from a boiler conveniently situated, into the hollow axis, whence it enters a box at one end of the cylinder, from which proceeds four hollow arms; through these arms the steam passes, then circulates between the two surfaces of the cylinder, making its exit from thence, through four other hollow arms at the opposite end of the cylinder, where it passes through another central box to that extremity of the axis; thence, proceeding downward, outside the apparatus, through a curved pipe, it enters the steam chamber formed by the cavity between the sugar pan and its jacket, or external case; the water produced by the condensation of the steam running off from the bottom through an open cock. As the aqueous portion of the solution in contact with the metallic surfaces is soonest expelled, the condensed saccharine matter quickly attaches itself in strata over those surfaces, to remove which as they form and re-mix the sugar with the thickening solution, three scrapers formed of straight bars of wood are employed; these are covered with woollen cloth, and are constantly made to operate by the revolution of the axis of the cylinder: a pinion on this axis drives another pinion on the axis of a crank, from which two rods proceed, giving an alternating motion to a scraper, which continually scrapes the bottom of the sugar pan; the scraper which operates upon the external side of the revolving cylinder is fixed longitudinally over it, (or out of the range of the alternating scraper last mentioned,) and the scraper which cleanses the interior of the cylinder, is suspended from the axis of the latter, and operates solely upon the bottom, by the effect of its gravity against the surface which is constantly passing under it.

To cause a vacuum in the sugar pan, it is closely covered over by a wooden case, having on the upper part a revolving fan or vane, fitted in a small circular box; a rapid rotation is given to this by a small pulley on its axis carrying an endless cord, which passes round a large pulley on the axis of the revolving crank before mentioned. The air and vapour is thus rapidly drawn off, the ebullition is in

consequence conducted at a lower temperature, and there is less risk of injuring the goods. The solution when sufficiently concentrated, is drawn off by a valve at the bottom of the pan.

There is much to admire in this apparatus; heat is well economised by it, and it is an elegant and scientific arrangement; nevertheless, we much doubt whether it will not be found rather inconvenient in clearing out the solution, and especially the sugar which will attach itself to the hollow radiating arms, for the cleansing of which there is no provision made by the patentee. As no practical mode of effecting this object has occurred to Mr. Atchison, we would suggest to him a very simple one; which is, to put heavy metallic rings loosely on the radiating arms, which would be constantly traversing their surfaces, as the cylinder revolved, and keep them clear of incrustations. [*Ib.*

FRANKLIN INSTITUTE.

Twenty-sixth Quarterly Meeting.

The twenty-sixth quarterly meeting of the Institute was held at their Hall on Thursday evening, July 15th, 1830.

Mr. S. V. Merrick, was appointed chairman, and

Wm. Hamilton, secretary pro tem.

The minutes of the last quarterly meeting were read and approved.

The quarterly report of the Board of Managers, and also of the treasurer, were severally read and accepted, when, on motion it was resolved, that the report of the Board be referred to the committee on publications, to publish such parts as they may deem expedient.

The committee appointed at the last quarterly meeting to fit up the rooms in the hall recently occupied by the United States courts, for a reading room, and cabinets of models and minerals, presented the following report, viz.

The committee appointed at the stated meeting in May, to receive donations, and fit up the reading rooms of the Franklin Institute, report:

That in conformity with the instructions of the Institute, they proceeded immediately to take measures to effect the object of their appointment.

The sum of 406 dollars has been subscribed (towards defraying the expenses incurred in preparing the rooms) by members of the Institute; a list of the donors, with their respective amounts, is herewith presented. Many other members have promised their aid, but have not yet subscribed; their names will be reported at the next meeting of the Institute, together with a catalogue of books presented, with the donors' names. So soon as the committee felt authorized by the amount subscribed, they gave the necessary instructions for making the cases, &c.

In concert with the committee on minerals, they have prepared the north-east room for their use, by arranging in them the cases taken from the first and third stories. These cases your committee

believe will be sufficiently commodious for the present wants of the Institute, and they would respectfully urge the immediate arrangement of the minerals therein.

The model cases from the lower rooms have been arranged at the west end of the hall, which, with the space allotted for models on the tops of the book cases, will afford ample room for present purposes.

Your committee had prepared, eight book cases to stand in the recesses on each side of the windows, intended as the commencement of a general plan to be completed at a future period, by continuing them to the ceiling, extended over the windows, to be approached by a gallery round the room even with the base of the upper cases. This they believe will be found the most economical arrangement, and one giving ample space for the library for a considerable space of time. The committee would call the attention of the members to the vacant shelves, under the hope that either by donation or loan of books, they will assist in placing the library of the Institute on a more respectable footing.

Exchanges for the Journal have been effected with numerous periodical works, and about 25 newspapers, which it is believed will be much increased. Your committee recommend that the rooms be opened to members under suitable regulations, from and after the monthly meeting, on Thursday next, and they feel confident that so soon as the present arrangements are known to the members, the hall of the Franklin Institute will become a point of attraction to the mechanics of Philadelphia generally.

Your committee have prepared rules and regulations for the government of the reading rooms, which they herewith present for your consideration, and, if adopted, they would respectfully recommend that the actuary should be instructed to have them printed on a card, and distributed to each member of the Institute.

The cases, it will be perceived, are not yet finished, the sashes being in the glazier's hands; they will, however, be completed before the monthly meeting.

The committee beg leave, in pursuance of the foregoing suggestions, to offer two resolutions for the consideration of the Institute.

1. Resolved, that the actuary be instructed to give public notice in the newspapers, that the reading rooms of the Franklin Institute will be opened for the use of members, on Thursday, July 23d, and remain open daily between the hours of 3 and 10 o'clock, P. M.

2. Resolved, that the actuary be instructed to have the rules and regulations for the government of the reading rooms printed on a card and transmitted to each member of the Institute.

All which is respectfully submitted, by order of the committee.

S. V. Merrick, *Chairman.*

Philadelphia, July 14th, 1830.

The above report having been read, together with the accompanying rules and regulations for the government of the reading rooms

and library, it was on motion accepted, and the regulations were ordered to lay on the table until the next monthly meeting.

S. V. Merrick, *Chairman.*

Wm. Hamilton, *Recording Secretary pro tem.*

The Twenty-sixth Quarterly Report of the Managers of the Franklin Institute of the State of Pennsylvania, for the Promotion of the Mechanic Arts.

In compliance with the constitution, the Board have the pleasing duty of presenting at this meeting, their twenty-sixth quarterly report.

The last quarter has been rather one of preparation for future exertions, than of active operations; as the season of the year when many of the members are dispersed throughout the country, or too deeply engaged to admit of their devoting much time to the Institute, renders it necessary to suspend the lectures, &c.

The Board have, however, been occupied in the prosecution of some of the objects which had long been before the Institute, and have much pleasure in advising you that progress has been made in several of these, but not sufficient as yet to warrant the publication of their proceedings.

Of these the most important, perhaps, is the inquiry into the advantages of the several forms and constructions of water wheels, which the committee who have the subject in charge, have been incessantly occupied in prosecuting. The results which they have already obtained justify us in hoping that, when completed, the investigation will be found productive of useful and interesting observations upon a subject which, however extensive in its applications, has hitherto been attended with much uncertainty and obscurity.

The Board have much satisfaction in adverting to the arrangements that have been made for the improvement of the reading room department of the Institute, by the appropriation to this object of the large hall in our building, which has been restored to us in pursuance of the arrangements lately made with the Marshal. By the liberal donations from a number of our members, the library has received large and valuable accessions of books; and through the laudable zeal of the committee appointed by the Institute, at their last quarterly meeting, a handsome subscription has been raised for the purposes of arranging the books, minerals, and models of the Institute. It is hoped that the measures that have been adopted will be found to unite economy with convenience; at the same time that they are such as to admit of further extension, as the library and collections of the Institute become enlarged, and we indulge in the belief that the members will now find at the Institute sufficient attractions every evening, to induce such of them as are not better engaged, to visit it frequently and avail themselves of the resources for instruction which it affords them.

The Board having observed with great pain the numerous acci-

dents that had lately occurred in the boilers on board of steam boats, were led at their meeting of the 13th of May last, to institute an inquiry into the causes of these accidents; that inquiry is now in progress. The committee to whom it has been entrusted have issued a circular soliciting information from all persons conversant with the subject. Until this information be collected, all conclusions as to the causes of the accidents, and the remedies to be applied, would be premature. The Board have seen with great pleasure, that the subject had been brought up for discussion at one of the regular monthly meetings of the Institute, and from the interest which it excited, they deem it unnecessary to extend their observations upon this subject at present; they will confine themselves to inviting the Institute to entertain favourably the request which the special committee on that inquiry have resolved to make, which is, that this question shall for some time to come, be considered as a standing topic of discussion at all the meetings of the Institute, and that all the members be earnestly invited to communicate to the committee either verbally or in writing, "the result of their observations, experience or reflection upon this subject."

Believing that in an institution of the nature of ours, it was our duty by all fair and reasonable means, to strengthen the ties which attach the members to the body at large, the Board have resolved to have a handsome diploma or certificate of membership engraved. At their last meeting they adopted a design proposed by our fellow member, Mr. Thomas Sully; it will be executed as soon as possible, and then distributed to the members under such regulations as may be deemed expedient, and which will be duly communicated to the Institute.

The Board having been advised that inconvenience was supposed to exist among some of the members, from the manner in which the by-law relating to the annual payments of the members was worded, have determined to amend it so that any member elected at any time during the financial year, ending on the 30th of September, shall be called upon for the payment, not of the whole annual subscription, but merely such part of it as shall be proportionate to the unexpired time, avoiding all fractions of months.

A vacancy in the Board having occurred by the resignation of our esteemed fellow member, G. Fox, Esq. Professor Alexander Dallas Bache was elected to supply his place.

The Board neglected to notice in their last quarterly report, the resignation of Mr. Ashbel G. Ralston, and to inform the society that they had filled his place by the election of Mr. Wm. H. Keating, formerly one of the most zealous and efficient officers of the society, and whose return to our city, and his co-operation in promoting the object of our institution, the Board consider a subject of congratulation to the society.

In conclusion, the Board would beg leave to remind our members that their biennial exhibition of the products of American industry and ingenuity will take place in the middle of September. The Board are satisfied that the progress of our manufactures in the last

two years, has been very great, but with a view that our display may be proportioned to the importance of the subject, and that it may not fall short, but, if possible, surpass the very brilliant ones which we have hitherto had the good fortune to hold, it becomes every member of the Institute to consider how he may facilitate our success by his exertions in the cause. Every member has it in his power to assist either by sending products of his own industry, or by inviting those of other persons in this or in any of our sister states. We have reason to believe that no exertions of our committees, however great, have as yet been adequate to the dissemination of information on this point in the interior of Pennsylvania, and still less in remoter districts. We earnestly, therefore, invite the attention of our members to it, especially of those who can contribute to it from their own manufactories and workshops.

All which is respectfully submitted.

S. V. Merrick, *Chairman.*

Wm. Hamilton, *Actuary.*

Monthly Meeting.

The stated monthly meeting of the Institute was held at their Hall on Thursday evening, June 24, 1830.

Mr. S. J. Robbins was appointed chairman.

The minutes of the last meeting were read and approved.

The following donations were presented to the Institute, viz.

By Mr. John Grigg.

Coxe's and Cooper's Emporium, 5 vols.
The works of Flavius Josephus, in 2 vols.
The History of Ancient Greece, by Gillies.

By Mr. James Hogan.

The Elements of Natural and Experimental Philosophy, by Cavallo.
Mackenzie's 5000 Receipts.
Principles of Political Economy, by Malthus.
Italy during the Consulate and Empire of Buonaparte, by Botta.
Letters from Paris, by Didier.
A Tour from New York to Detroit, by W. Darby.
Descriptio Uberior Graminum, by Muchlenberg.
A General History of Birds and Quadrupeds, by Bewick.
Creation; a Philosophical Poem, by Blackmore.
The History of France, by W. Grimshaw.
The Life of Napoleon, by W. Grimshaw.
The Grammar of Astronomy, by J. Towle.
A Grammar of Chemistry, by D. Blair.
Lectures on Rhetoric, by D. Blair.
History of Animals, by Webster.
The American Constitutions.

By M. Carey, Esq.

The History of the World, by Guthrie, 10 vols.

By Thomas P. Jones, M. D.

The Speech of Mr. Frelinghuysen, in the Senate of the United States.

The Speech of Mr. Barton, in the Senate of the United States.
The Speech of Mr. Holmes. do. do.
By Mr. Samuel T. Jones.
A History of the Cotton Manufactures, by Guest.
By Isaac Hays, M. D.
Rapport sur Les Lampes Hydrostatiques.
By Mr. S. C. Atkinson.
The Casket, for 1827, 1828, *and* 1829.
By R. La Roche, M. D.
Intorno Alla Direzione Degli Aerostati.
By Lt. Col. S. H. Long.
Narrative of the Proceedings of the Board of Engineers of the Baltimore and Ohio Rail-road Company, also
A twenty feet model of the "*Jackson Bridge,*" constructed and patented by himself.
By Jacob Pearce.
A specimen of graphic granite.

The corresponding secretary laid on the table the following works, received in exchange for the Journal of the Institute, viz.

Annales de Chimie et de Physique, for December, 1829, and January, 1830.
Bulletin de la Société d'Encouragement pour l'Industrie Nationale, for December, 1829.
Programmes de Prix Proposes, for 1829, 1830, 1831, and 1832.
Recueil Industriel, for December, 1829, and January, 1830.
Bibliothéque Physico-economique, for February and March, 1830.
Annales des Mines, Nos. 4 and 5, Vol. 6, 1829.
The North American Review, for July, 1830.
The Southern Review, for May, 1830.

Professor Alexander D. Bache, on behalf of a committee appointed by the Board of Managers at their meeting held on the 10th inst.

Reported, that the Board of Managers had appointed a committee to inquire into the probable causes of the explosion of the boilers used on board of steam boats, and if possible to devise, or recommend the best means by which the unfortunate occurrences can be prevented or guarded against.

That the committee had commenced discharging the duties assigned to them; that they have had several meetings, and had a circular prepared to be addressed to such persons as were acquainted with the subject, (which circular was read) and also the proceedings of the Board of Managers on the subject; he also stated that the committee recommended to the Institute to adopt the following queries as a subject of discussion at their meetings for that purpose, viz.

1st. What are the probable causes of the explosions of boilers on board of steam boats?

2nd. If any, what are the best means to obviate the recurrence of these evils, or to diminish the extent of their injurious influence, if they cannot be wholly guarded against?

3d. By what means can these remedies be applied and enforced?

On motion, the report was accepted, and the questions recommended by the committee were adopted for the discussion at the monthly meetings.

The chairmain stated that the subject of the explosion of steam boilers was now before the meeting for discussion, when Professor Johnson laid on the table a part of a boiler which had been exploded, and made some remarks on the subject, and was followed by Col. S. H. Long, Professor A. D. Bache, George W. Smith, Esq. and several other members, after which the further discussion of the subject was, on motion, deferred until the next monthly meeting.

On motion, adjourned.

SAMUEL J. ROBBINS, *Chairman.*

ISAAC B. GARRIGUES, *Recording Secretary.*

Observations and inquiries respecting the materials employed in the fabrication of Detonating Powder. By JOSHUA SHAW, Esq.

TO THE EDITOR OF THE JOURNAL OF THE FRANKLIN INSTITUTE.

SIR,—Having been obliged, by your attention to my former communications, I have taken the liberty in this instance, to ask for information, instead of furnishing any myself. It proceeds, however, from a conviction that if my queries are answered satisfactorily, they will be of some general service to the community. Should it not be in your power to reply to the matter in question, it might be so far worthy of your attention as to allow me to seek it through the medium of the Journal of the Institute.

It will be recollected that in April, 1829, I made a communication respecting fulminating powders, (page 271, vol. iii.) and with the view of complying with some remarks made by yourself, and which immediately follow that communication, I have devoted a very considerable portion of time to the performance of a series of experiments, with a view to the furnishing such a statement as would be found useful and satisfactory. I commenced with the oxy-muriate of potash, sulphur, and charcoal, a composition totally forsaken as respects its use in small arms, though I am still in the habit of employing it as a priming for my percussion locks for cannon, which have been introduced on board our public armed vessels. In this lock I have preferred to use the powder made with the oxy-muriate of potash, not because I think it equal in general to the fulminating mercury, but because it presents in this particular application of it, some advantages over the mercurial compound. In making the preparations from the oxy-muriate, I had occasion to purchase a quantity sufficient for several thousand primers, and had some difficulty in obtaining it. After much inquiry, I met with five or six pounds, but in two different parcels, one labelled *Muriate sur ozigené potasse. Pharmacie de Paris*, the other labelled *Chlorate de potasse*, &c. &c. I was assured at the time of purchase, that the two articles were perfectly similar; not, however, being satisfied, I inquired of one or two persons who professed to understand chemistry, as to this fact, but, to

my surprise, could not obtain a satisfactory answer. I made several trials with each of the parcels, and found the one labelled oxy-muriate much the strongest, as it fired with a lighter blow, and gave out a larger quantity of gas, but even this was much inferior to what I had been in the habit of procuring.

From my experiments, I have been led to conclude that these and what I have formerly used, are all the same article, good, middling, and bad; their differences arising from carelessness in the making. After this long preface, allow me to propound the following questions.

First. Are oxy-muriate of potash and chlorate of potash, the same thing, or are they different articles, only bearing a strong resemblance to each other?

Secondly. Is there any ready and convenient test by which their purity, or degree of adulteration can be detected? If not, I believe it would be better to abandon the use of this article altogether in making priming powder for cannon, excepting our government should take this business into their own hands, when there would be no difficulty in procuring the best from abroad, or having it prepared at home, by giving orders for it in quantities sufficient to induce the manufacturer to prepare a first rate article; inducements which an individual, depending on small and temporary orders from the government, cannot hold out.

I have no doubt but that these simple inquiries may cause those learned in chemistry to smile, but this I am willing to bear, provided I can obtain the necessary information, as I shall then be prepared to furnish a statement of the value of the several fulminating powders used as a priming for cannon and small arms, particularly those made from oxy-muriate of potash, and from fulminating mercury. Without this information I may be deceived by the use of an article of inferior quality, and the value of my statements be consequently destroyed.

Yours, very respectfully,

JOSHUA SHAW.

Remarks by the Editor.—We are not of the number of those who are inclined to smile at the difficulties which the practical man frequently encounters from the want of theoretical knowledge. The professed chemist finds it no mean task to keep pace with the progress of his science, and more especially with those numerous mutations which have taken place in the nomenclature, to suit the theory or the fancy of its professors. The salt in question has, in English, been called hyper oxygenated muriate of potash; oxygenated muriate of potash; oxy-muriate of potash, and chlorate of potash; and there have been French names corresponding with each of these, two of which occur in the foregoing paper. The chemist knows the reason of these changes, and cannot easily realize the difficulty which they create in the minds of others, who expect to meet with the same thing under the same name.

The two portions purchased by Mr. Shaw ought to have been pre-

cisely alike, and any difference between them must have arisen from the impurity of one or both. The following may serve as good practical tests of the comparative value of different parcels. If the chlorate (oxy-muriate) of potash be mixed with sugar, and the mixed powder be touched with a thread, or stick, dipped in sulphuric acid, (oil of vitriol,) combustion will take place; that which will burn most rapidly and completely with the smallest portion of the salt, is the best. The chlorate and the loaf sugar also should be triturated in a mortar, and the two mixed together intimately in given quantities. If the quantity of chlorate be sufficient, there will be so complete a combustion of the sugar as to leave scarcely any residuum. With a smaller portion the residuum will be greater, and with a portion just sufficient to produce ignition, it will be considerable.

Chlorate of potash and sulphur mixed together, explode by the blow of a hammer on an anvil. This property also may supply a test. That salt which will, in the smallest proportionate quantity produce an explosion, is the best.

The largest quantity of this salt which we ever saw together, was of our own manufacture; it weighed eight pounds, and was of the utmost purity; the process was continued for four days. This was 17 years ago, when chemical manufactories were but little known here, and war interfered with the importation of the article. We would willingly give the process for the information of any one who wished to essay it, but do not think this now necessary. Any of the chemical laboratories at which the chlorate of lime (bleaching salts) is manufactured, could readily supply this salt, and we have no doubt would undertake to make it in a quantity not exceeding ten or twelve pounds. The process is one which does not present any difficulty to the chemist, but to one not habituated to chemical manipulation, it would be not merely difficult, but extremely unpleasant.

The salt, when good, is in thin scales of a beautiful pearly appearance.

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

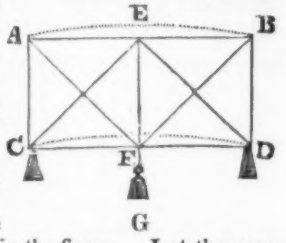
Remarks on the Jackson Bridge. By Lt. Col. S. H. Long, *the patentee.*

A description and drawings of this bridge have already been given in the April number of this Journal. We now take occasion to offer the following remarks explanatory of the principles and manner of action that take effect in consequence of the peculiar arrangement of the parts of this structure.

The principles aimed at in the construction of this bridge, are such, that the strain to which the truss frames are subjected, by the heaviest load that is admissible upon the bridge, is no greater than that exerted upon it without any load at all. Paradoxical as this may appear, it is, nevertheless, demonstrably the fact, with respect to all parts of the bridge, except the arch braces, and those parts

merely which are in contact with the sleepers or bolsters, upon which the bridge is sustained.

In demonstration of the truth of this proposition, we have only to inspect the annexed diagram, which may be regarded as representing one of the truss-frames, and in which AB represents the upper, and CD the lower string; AC, EF, and BD, three posts, EC and ED the main braces; and FA and FB, the counter braces. Suppose the frame deprived of the counter braces, and the strings occupying the position of the curved dotted lines, let a weight, G, be suspended at F, heavy enough to depress the frame to the straight line AB and CD, as represented in the figure. Let the counter braces FA and FB be now inserted; after which let the weight G be removed. It is obvious that the strings AB and CD will still retain their straight direction, and the addition of the weight will have no other effect upon the truss-frame, than merely to relieve the counter braces of their action, the stress or strain upon the truss-frame remaining the same, whether the weight is sustained by it or not.



If keys or wedges be applied at A and B, over the heads of the counter braces, and driven in such a manner as to communicate an appropriate thrust from A and B, towards F, we have the strain upon the truss-frame completely exemplified, without the use of the weight.

However the number of spaces in the truss-frame may be multiplied, if the additions be made equally on both sides of the centre, or in both directions from E and F, the same system of action will be communicated to all parts of the truss-frame situated between the abutments of the bridge.

The timber best adapted to the construction of a frame bridge, is white pine. The qualities which entitle it to this distinction are, its lightness, stiffness, and exemption from the ravages of worms, insects, &c. Cypress, yellow pine, white cedar, hemlock, poplar, and chesnut, are to be regarded as among the most valuable substitutes afforded within the limits of the United States. Yellow, or hard pine, is probably better adapted for the necessary keys and wedges than any other material; but when those are not to be had, white ash, white oak, locust, or chesnut, may be used to advantage. The timber employed, especially in the frame work of the bridge, should be perfectly sound, free from sap, knots, shakes, splits, twists, and all other defects calculated to impair its strength, tenacity, and durability; and should be of the character denominated "quartered timber," or timber cut through, and deprived of the heart or pith.

The splicing pieces, when constructed of wood, should be of the same timber as that of which the strings are composed. Splices of cast iron are, however, deemed more efficient and economical, when they can be procured with convenience.

The flooring should be of yellow, or white pine, if practicable; and in all cases, the material of which it is made should be the light-

est attainable. The exterior covering, should it be applied, ought also to be constructed of the lightest materials.

The wrought iron employed on the bridge is intended merely to clamp, or bind together, the parts of the structure, and is to operate exclusively by tension, independently of any transverse strain, or leverage, upon the bolts, &c.

Table showing the dimensions of string pieces for spans of different lengths; as also the area of the floor, and the weight that may be sustained, if distributed over the surface, independently of the weight of the bridge.

Statements. No.	Length of Span. Feet.	Height of Truss Frames. Feet & parts.	Transverse dimensions of the string pieces, exclusive of notches, holes, and defects of all kinds. For single action. 2 side string pieces. Width in inch. & pts.	2 side string pieces. Depth in inch. & pts.	1 centre st'g p'ce. Width &c.	1 centre st'g p'ce. Depth in inch. & pts.	For double action. 2 side st'g pieces. Width in inch. & pts.	2 side st'g pieces. Depth in inch. & pts.	1 centre st'g p'ce. Width in inch. & pts.	1 centre st'g p'ce. Depth in inch. & pts.	Area of the bridge floor. Sq'e Feet.	Load that may be sustained on the bridge. Tons & parts.	Aggregate transverse area of each string. sq. in. & pts.
1	60	13.5	3	3.25	5.5	3.25	,,	,,	,,	,,	1200	64.32	37.33
2	70	13.5	3	4.5	5.5	4.5	,,	,,	,,	,,	1400	75.4	50.8
3	80	13.5	3.5	5.33	5.5	5.33	,,	,,	,,	,,	1600	85.76	66.37
4	90	13.5	4	6.25	5.5	6.25	,,	,,	,,	,,	1800	96.48	84
5	100	13.5	4.75	6.5	6.5	6.5	,,	,,	,,	,,	2000	107.2	103.7
6	110	14	5.5	7	6.5	7	,,	,,	,,	,,	2200	117.92	121
7	120	14	6.5	7.87	6.5	7.87	3.75	6	5.5	6	2400	128.64	72
8	130	14.5	7	8	6.5	8	4	6	5.5	6	2600	139.36	81.5
9	140	14.5	8	8.25	7	8.25	4.75	6	6.5	6	2800	150.8	94.6
10	150	15	8	9.13	7	9.13	4.87	6.5	6.5	6.5	3000	160.8	104.9
11	160	15.5	8	9	7.5	9	5.62	6.63	6.5	6.63	3200	171.52	116.6
12	170	16	8.25	10.63	7.5	10.63	6.5	6.63	6.5	6.63	3400	182.24	127.5
13	180	16.5	8.25	11.63	7.5	11.63	6.5	7.13	6.5	7.13	3600	192.96	138.6
14	190	17	8.5	12	8	12	6.5	7.75	6.5	7.75	3800	203.68	149.9
15	200	17.5	8.5	13	8	13	7	8	6.5	8	4000	214.4	161.3
16	220	18	,,	,,	,,	,,	8	8.25	7	8.25	4400	235.84	189.8
17	240	18.5	,,	,,	,,	,,	8.13	9.5	7	9.5	4800	257.28	219.8
18	260	19	,,	,,	,,	,,	8.25	10.5	7.5	10.5	5200	278.72	251.1
19	280	19.5	,,	,,	,,	,,	8.25	12	7.5	12	5600	300.16	283.8
20	300	20	,,	,,	,,	,,	8.25	13.5	7.5	13.5	6000	321.6	317.6

Note.—In the last column of the foregoing table, the statements, No. 1 to No. 6, inclusive, exhibit the areas of the strings as computed for "single action," while the residue of the statements represent the areas for "double action."

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

Some observations on the Patent Laws of the United States; intended to call public attention to that important subject. Addressed to the Managers of the Franklin Institute.

I have, gentlemen, noticed in the public prints, the appointment of a committee on the the part of the Franklin Institute, to enter upon inquiries respecting the causes which have produced so many steam boat accidents, and, if possible, to discover a remedy by which their future occurrence may be prevented, and was much gratified to find this inquiry undertaken by an institution expressly organized for the purpose of improving the mechanic arts, and composed of gentlemen well qualified for the undertaking; in such hands there can be little doubt that a remedy as effectual as the nature of the case will admit of, will be discovered.

The writer of the present communication is anxious to call the attention of the Institute to another subject which, so far as property is concerned, he believes to be of equal importance to the community, and equally within the purview of your society. He alludes to the patent laws, the glaring defects of which are proverbial, as they are neither calculated to stimulate, or to protect the inventor. They appear not to be well understood, even by the best counsel, and are so differently interpreted by the courts, that it is next to impossible for a specification of a patent to secure any right to the proprietor of a valuable invention; it consequently so happens that men of genius and talents aware of these facts, feel no disposition to risk their time and capital in making new or useful discoveries, or even putting those into operation which they have discovered. The expense usually attending the bringing them to perfection is very great, as numerous trials, and frequently the erection of expensive machinery are requisite, and, if at last successful, the invention is open to infringement as soon as it shall be known to afford remuneration to the inventor; and the pirate, availing himself of it, proceeds to work with every advantage, without previous cost, loss of time, or even a claim to ingenuity. It is, therefore, the opinion of every man informed upon the subject, that the patent laws require to be revised and corrected, if not entirely re-modelled. A committee appointed by the Franklin Institute, could not, it is believed, be better employed than in digesting some mode of securing to the inventive mechanic his just reward. I know not where such a measure could originate with equal advantage to the community at large, or where it can be expected to be better understood. Congress, it cannot be doubted, would listen to, and be ready to act upon, any well digested plan that might be presented to them which should appear well calculated to secure the important ends for which the patent law was originally passed. I will here call to your recollection a fact which is well known to you, and appears to me illustrative of the opinions which I would enforce. I allude to the premium offered by the managers, or superintendents, of the rail-road constructing between

Manchester and Liverpool, as it will at once demonstrate the advantages which are attainable when a certainty of indemnity is presented to those who may succeed in perfecting a valuable invention. Five hundred pounds were offered for a certain purpose, and the result produced by it was not only unexpected in regard to its value, but wonderful and extraordinary in itself as a proof of science and ingenuity. What was the charm which could produce so sudden an effect? did not the patent laws of England, like our own, hold out the prospect of a reward much above five hundred pounds? they did, but the uncertainty involved in their construction destroys them as a guarantee to the mechanic; they are, like our own, indefinite. The premium was otherwise, it was comprehensible and comprehended. It was a happy thought in the person who first suggested the experiment; he was, no doubt, well acquainted with the springs of human action, and the history of man. We are not, however, to suppose, that it was the bounty alone which produced the effect, for it was trifling in comparison to the expenses to be incurred. It was the certainty that if the party succeeded, he would be remunerated by the extensive use of the machinery, and a claim secured to all the fame and reputation which were sure to follow in the train, as they did not rest upon the frail tenure of the patent laws alone. If, however, they were such as they ought to be, the bona fide inventor, or discoverer, would require no adventitious reward; the fruit of his own talents and industry would satisfy him were these secured to him.

Every inventor of this description would be willing to submit his claim to a jury of scientific men, who were at the same time practically acquainted with the mechanical and chemical arts, and thus competent to the undertaking. They having decided on the merits and originality of an invention, should pronounce judgment accordingly, and the claim be made to rest upon it. In this way there would be every thing to hope, and little to fear; instead of this, however, we are referred to laws which are acknowledged by the judges themselves to be so framed as to be quite indefinite; and liable to be differently explained by different persons. It is notorious that the judges have decided the same points in a way the very opposite of each other, relying upon antiquated precedents made to operate in different ways, according to the sapient reasonings which have been laid down by men perfectly destitute of all mechanical knowledge. The merits of an invention, in all cases, should be decided upon the principles of equity.

One lawyer tells you that *an effect* cannot be patented, because some great counsellor has held that opinion, or that some judge has pronounced upon it. Let us try this maxim by the rule of common sense. If an effect be produced which is new, and of great public value, and perhaps discovered at great expense to the inventor, why shall it not become his property, even though the materials employed, and the method of operation, have both been long known and in use, but not so combined and employed as to produce the same effect. But one judge invalidates, or negatives one thing, and another a se-

cond, so that an inventor has scarcely a tenter hook left him upon which to hang a single assurance of protection. It has been repeatedly stated that if a patentee discover an error in his specification, he may amend it by cancelling his patent, that is, by surrendering it and petitioning the secretary of state to issue it anew. Such is the doctrine of some of the judges presiding in the United States courts; and many patentees under this impression, and trusting to such advice, have surrendered their rights, and paid an additional thirty dollars into the treasury, to be better secured: but will they believe that other judges equally eminent for their legal knowledge, have declared that such patents are void on the face of them? It was so declared not many days ago in the District Court of the United States, in the city of New York; but, said the judge, you can appeal to the Supreme Court, and in the mean time you may proceed to try the merits of your claim for damages. The case was opened, and a violation of the patent proved. It was also held that the patentee was the original inventor. It was also in evidence that whilst the plaintiff, who was an alien, was waiting for the completion of the two years, the time prescribed by law before a patent could be granted to him, his invention was betrayed, for a bribe of ten guineas, in a foreign country, by which it appeared that the public became possessed of it, and this was held to be good reason for voiding the patent; neglect was charged to the plaintiff in omitting to take out his patent sooner than he did, although it was proved that it was during the period when he did not possess that privilege, that it was betrayed.

A good invention is, to the inventor, frequently a bill of expense only, since it may be stolen from him, or violated with impunity. If he make a change in any of the parts connected with his machine, or improvement, although such change shall enhance, materially, the value of it, without at all altering its principle, this is deemed sufficient to void it, on the ground that he has himself abandoned it, and introduced changes not mentioned or contemplated in the specification; or it will be said that he has secreted from the public the best method within his knowledge, and therefore has failed in complying with the law; now though this sort of argument might be good in respect to certain compounds, or quack medicines, good or bad, and which the public have no means of analyzing, yet it cannot be applied to the mechanic arts; there is no secret mystery in a piece of mechanism; no magic power can give it motion, but those laws which govern natural causes, and produce corresponding effects; and yet this jargon is held and applied indiscriminately in all cases involving rights, *secured*, as it is termed, by the patent laws. It sometimes happens that an invention is of so singular a nature that the most learned lawyers have been heard to say that it was in particular cases impossible to make a specification which they could not themselves destroy. The lawyers say that two or more parts of an invention must be new, when it may really happen that a valuable invention may consist of a single ingredient matter or thing; sometimes it may consist of one or more parts which are really old, but by cer-

tain modifications they have been applied to a use entirely new, and have become extremely valuable, but you are told that merely varying the shape of a thing will not be good for a patent. In short it is impossible in the greater number of cases, owing to the uncertain phraseology of the laws, and the various opinions of the judges, as to their meaning, to secure any property under them; and it is almost impossible, where the rights of an inventor are violated, for him to obtain an injunction to restrain the violating party from further proceedings. How stands the matter in regard to all other property? is it not necessary for a person claiming a right to property in the possession of another, to sue for it, and to procure a verdict before he can take possession of it? does justice distinguish betwixt property consisting in houses and lands, and that which is acquired at greater risk and toil, and by the exercise of genius and talent? If there is any distinction to be made, it should be reversed, because a useful invention is valuable to the whole community.

From these and other considerations, it is, in common with many others, the opinion of the author of the foregoing remarks, that something should be done to effect a total change in the patent laws, so as to give to a most useful class of men, that security which was no doubt intended by the framers of the existing laws, but which from various causes have been found totally inapplicable, failing to effect the purpose. It is, therefore, believed that if the Managers of the Franklin Institute would undertake to investigate and point out the inconveniences of the present laws, and suggest such alterations and revisions as would render them available to the inventor, they would perform a service invaluable to the community at large, and one which would be honourable to our national character.

I am, with great respect, &c. &c.

A Friend to the Mechanic Arts.

Remarks by the Editor.—With the main proposition of the writer of the foregoing observations we agree perfectly, namely, that the law for granting patents for useful inventions is defective, and requires revision. Whilst, however, we admit this most fully, we do not believe it to be possible, or were it possible that it would be proper, to enact such a law as would be satisfactory to patentees. We are convinced from long experience, and careful observation, that the complaint about not having their rights defended, is made, in a very large majority of cases, by those who have no rights, of the kind in question, to defend. Every man when he has obtained a patent, feels as though, by the payment of the fee, he had acquired a right to the thing patented, and that this right is violated if the law does not protect him. Now this is altogether a false view of the question. The greater number of patents are obtained for things which are either old or frivolous, and have no claim, therefore, to respect; almost every one will admit this to be true in the abstract, but no one in his own case; the public, however, must be the arbiter, and the hopes which had their foundation in error be disappointed.

The patent law is not intended to confer any right, but to confirm

those already existing. A man has discovered, or invented, something new, and he has a natural and inherent right to it, he may in many cases practice the thing secretly, and in all he may suppress it; the idea is his own, and no man has a right to extort it from him. That this kind of property may become available both to the inventor and to the public, a law has been passed giving to him an exclusive right for fourteen years, upon condition that it become public property at the end of that time. From the very nature of the case the allegations upon which a patent issues must be *ex parte*. The applicant states that he has effected a certain object, and that it is new; and the patent is then granted. What could be more monstrously unjust than that such a claim should not be liable to be traversed? In most cases the patentee is deceived, or is a deceiver, and the public is not, in either, to be made the victim. If I enter a tract of new land, and obtain a patent for it in the proper office, and put my patent upon record, will this make the land mine, and will the defence of my claim be a public duty because I have paid the fee? certainly not; if I have lapped upon, or taken another man's property, or that of which the public had no right to dispose, neither my patent or its record will do me any good.

The project of a *Board of men of practical science*, is a favourite one, and has been frequently advocated; when the idea is pursued, however, we meet with difficulties upon the very threshold of the inquiry. The main object proposed by the establishment of such a Board, is the final security of the patentee; but it must be recollected that there is another important interest to defend, that of the public, and this would be felt by such a Board, to the discomfiture of a host of applicants, who, if justly dealt by, would complain more loudly than they now do. How will you contrive to make such a Board infallible? and if you cannot make it so, will you yet allow it to pronounce final decrees? to declare that the invention of one man is old, and that of another new? Before this is done we must repeal our free constitutions, and abrogate the right of trial by jury.

These are but hints, and we have not time for more, nor indeed do we wish to enter the lists at present, although we are anxious that the question should be fully discussed. It may be imagined by some who read these remarks, that we are lukewarm on the subject of revising the patent law; such, however, is not the case, and it may hereafter appear that it is one in which we have engaged with untiring zeal.

Should our friends write upon this subject, as we hope they will, if they wish their essays to be read, they should be brief. Three or four pages at a time are as many as can with propriety be devoted to such a question.

On French embossed and other works in flattened Straw.

In a late volume of the *Dictionnaire Technologique*, we find an interesting article on this subject. This manufacture, before the

French revolutionary war, had been confined to religious establishments, and especially to those of the Carthusians; and it is to an artist of this class, that the editors of this respectable work are indebted for the first publication of the particulars of the several processes employed in it.

On the choice of the Straw, and its preparation.

The straw of all cereal plants is not equally fit for these kinds of works; we must choose that which is the whitest and the thinnest, and whose tubes are the largest and longest. The two-rowed barley, *hordeum distichon*, L. possesses all these desirable qualities. It differs from the common or square-eared barley, in its head being flat, long, and having only two rows of grains; its beards and stems are rough to the touch.

At the approach of the season for gathering it, and when the heads are formed, they visit the fields where it is grown, and select the finest straw, of a yellow colour; they then cut it with scissors, near to the ground, deprive it of its leaves, and examine whether or not it be spotted. The mists and the rain in the spring, produce black spots, which it is impossible to remove; and we must therefore give the preference to those parts of the country where the straw has least suffered from this defect. Before collecting it, an agreement is made with the proprietor of the field, for leave to cut it carefully, provided that the heads be given to him, and which must also be cut off with scissors.

The stems are also separated into lengths with the scissors, by cutting them above and below the knots, which are rejected as useless, as are likewise the sheaths, and the small stems at top, which have too little width to be of any use. The most beautiful tubes are those which are the size of an ordinary writing quill, thin, and free from spots.

When the straw has thus been deprived of its useless parts, the tubes are selected according to their lengths, and placed in boxes, divided into compartments.

On bleaching the Straw.

When the selection has been made, it is necessary to bleach the straw, and especially that which is intended to be dyed of delicate colours; as we cannot be ignorant that, in any ordinary dyes, we cannot procure fine colours, unless the matters intended to be dyed approach near to a perfect whiteness. And, although the straw is generally yellow, yet it is not difficult to give it a fine white appearance. We employ the liquid chlorate of lime for this purpose, in a similar manner to that used in the ordinary bleaching processes; but it is blanched much more easily than linen, and even than cotton.

We need only take this trouble for the most delicate colours, such as a light rose colour, flesh colour, a tender lilac, a pale yellow, celestial blue, or azure, &c. For the less delicate colours, the bleaching of the straw by means of sulphur, is sufficient.

On bleaching the Straw with Sulphur.

The vessel most commonly employed for this operation, is a hooped cask about three feet high, and open at both ends. About the middle of this vessel, a net, strained upon a hoop, is lodged, the hoop resting upon several nails, driven into the sides of the cask for that purpose. The straw, in handfuls, bound round with thread, is laid upon this net, and crossed with other similar bundles, till the vessel is full. It is covered with a lid, similar to that of a snuff-box, the inside of the rim of which has woollen list nailed around it, in order to cause it to perfectly close the top of the vessel. The whole is also enclosed within a woollen envelope. We must also not forget, either to nail or glue paper all over the inside of the vessel, in order to close all the crevices, which might otherwise suffer the sulphureous acid gas to escape through them.

All being thus disposed, we place underneath the vessel, a chafing-dish, full of burning charcoal, over which we have placed a sheet-iron pan, containing a layer of sulphur. The sulphur, on being heated, inflames; and the sulphureous acid gas disengaged, fills the inside of the vessel, and bleaches the straw. Three or four hours are sufficient for this operation. Care must be taken that the sulphur is thinly spread over the bottom of the iron pan, as, should it be laid in too great a quantity, it would unite, and form a flame, which might reach too high in the vessel, and tinge the straw with an unchangeable blackness. This operation should always be performed in the open air.

When we no longer perceive the odour of the sulphureous acid gas, we uncover the vessel, and remove the bleached straw.

On the preparation of the Straw before dying it.

There are certain colours which the straw will not well take, unless it has been previously opened. This operation used to be a tedious one, but we have considerably shortened it by an instrument of our invention.

The straw must not be in a perfectly dry state, when we proceed to open it, as then, on seizing it at one end, it would break, and be unfit for use. We therefore let it lie all night on the flagged pavement of a ground-floor; this communicates a humidity to it, and damps it sufficiently to enable us to open it readily, and to dress and flatten it.

Formerly, we used a taper wooden spindle, to open the straw with; and, taking the tube of straw in the left hand, with the right hand we introduce the smaller end of the spindle into the bore of it, and, by inclining the spindle in a proper manner, we form a cleft, which we extend the whole length of the tube, by quickly pushing the spindle along in the direction of the cleft. The straw is then spread open upon the spindle, by rubbing it with a bone or ivory polisher, formed in the shape of a folding-knife. The flattening of the straw is then completed by rubbing it forcibly with the polisher on its bright side, whilst it is laid upon a strong and smooth plank of apple tree. This operation, which is to be performed upon each

tube of straw, we think is too tedious; and we have, accordingly, substituted the following in place of it.

We employ a pair of cylindrical rollers, mounted in a frame, in a similar manner to those commonly used in the manufacture of straw-plait to flatten it; and, in front, we affix to the cheeks of the frame, by means of screws, a steel instrument, made in the form of a snipe's bill, which is pointed at the front end, and spreads or widens towards the rollers; the underside of this instrument is made flat, and its upper side is angular, its sides being formed into sharp edges. This instrument serves both to open the straw, and to guide it beneath it between the rollers. This construction being understood, the following is the manner of using the machine. We take the moistened straw in the left hand, and cause the pointed end of the snipe's bill to enter the tube of it, and thrust it forwards; the straw rends, and we continue to push it forwards, at the same time turning the rollers, by the right hand, applied to the winch or handle of them, until we see that the straw is seized between the rollers. We then lose hold of the straw, and continue to turn the handle, until the straw has passed through the rollers, and falls completely opened and flattened, at the back of the rollers. We can thus prepare as many as ten thousand straws in a day; whereas before we were only able to prepare about a hundred! The straw thus prepared is now ready to be dyed.

On the process of dying the Straw.

Blue.—We take an ounce (thirty grammes) of fine Guatemala indigo, in powder, and place it, in a medical phial, upon a sand-bath; we then add to it two ounces (sixty grammes) of the sulphuric acid of commerce. When the effervescence has ceased, we add fifteen grammes of pure potash. It is then left in digestion for twenty-four hours.

This composition serves to dye blues of various shades. To use it, we put into a proper boiler, placed over a fire, the necessary quantity of water to completely cover the straw which we would dye. When the water boils, we then add the prepared sulphate of indigo, by the help of a wooden spoon, fastened at the end of a staff, and by small portions at a time, until we see that the bath has attained the shade we desire. We then remove the boiler from the fire, and throw the straw into it, but which, however, has not previously been opened or flattened. We keep the straw immersed, and when it has received the proper tint, we withdraw it, wash it in cold water, and leave it to dry.

Sky-blue or azure.—Prior to receiving this delicate colour, the straw must be opened or flattened; it must then be arranged in layers, in a square vessel of glazed earthenware, the layers crossing each other. We then take a portion of the remaining part of the blue dye, put it into another vessel, and add warm water to it; also stirring it to complete the mixture, as well as also adding more water, until we have obtained the required shade; when the bath is thus prepared, we pour it upon the straw, disposed as above mentioned,

and with pieces of wood placed in the vessel, and bent in the form of a bow against its sides, we force the straw to continue immersed in the dye. When it has received the proper tint, we wash it, and leave it to dry.

Yellow.—This colour is prepared with *curcuma*, in powder, which we boil in water, until it has received the shade we desire; we then throw into it the straw, in its entire state, not opened, and let it boil, until its tint is satisfactory, when we treat it as directed for the blues.

We dye with the residue of this bath the pale yellow shades upon unopened straw.

Green.—The straw dyed of these shades of yellow, when plunged into baths more or less blue, affords greens of different hues.

Red.—We must use for this colour, and all its shades, straw which has been opened and flattened in the manner above described, for receiving the sky-blue or azure dye; and it must also be disposed in a similar manner, in glazed earthen vessels. So likewise the finest straw, perfectly free from spots, must be chosen. The following is the composition of the bath.

We must procure from the dry-salters the dyed woollen threads, in skeins, tinted with a red colour, approaching to scarlet; and boil them for several minutes in water, which holds a little alum in solution; the wool gives up nearly all its colour to the water, and when it has attained the required shade, we pour it upon the straw, and suffer it to remain till cold. The dyed straw must then be washed and dried.

In default of scarlet wool, we may dye a red with cochineal, in the manner practised for silk dying.

Rose and flesh colours.—These are dyed with the residuums of the red dyes, which are to be heated, and be poured boiling hot upon the straw, disposed in the same manner as for dying azure.

Violet.—For this colour we employ the dyed sky-blue straw, and tint it in a rose bath, according to the required shades.

Lilac.—This straw is first dyed azure, and then flesh-colour.

We likewise dye straw of different shades of red, with Brazil wood, and by means of orseille.

Browns.—The various shades of these colours in straw, are first dyed green, then yellow, then red, and, finally, in a bath of Campechy wood (log-wood.)

Black.—The straw is first to be treated with galls, then in a bath of pyrolignate of iron, and, lastly, in one of Campechy wood.

On pasting the Straws.

The straw, whether of its natural colour, bleached, or sulphured, is never employed until it has been previously formed into plates or sheets; that is to say, it must be polished anew, flattened, and pasted, the one straw by the side of the other, upon leaves of thin paper, in order to prevent them from becoming too thick for use.

Each plate or sheet generally consists of from fifteen to twenty straws, according to their width. They commence by selecting

them one by one, in order to regulate their tints; as it is proper to mention, that all the straws, although dyed in the same bath, will not equally present the same tint.

After being thus selected, their edges are cut straight. In order to this, they are placed upon a stout plank of apple-tree, well planed, the straw being spread upon it, with its polished side downwards; it is then nearly covered with a thin blade of iron, the edges of which are perfectly straight, in such a manner, that a thin thread of straw may project beyond the edge of the rule or blade; this thin thread is then to be cut off, by means of a very sharp knife, passed along it, close to the edge of the rule; the knife resembling in form an erasing knife, or lancet.

After having thus regulated each straw, on both its sides, and having prepared a sufficient number of all colours, they are to be cemented upon paper, by means of flour paste. We must have at hand a good screw-press, formed wholly of iron, of an improved construction, and of which we shall presently give a description. Upon the flat table of the press, on which the screw is destined to act, we place several small and thin planks of walnut, and between every two planks, three or four leaves of paper. It is between these planks, and in the midst of the paper, that we place the leaves of pasted straw.

This press is, as before said, constructed entirely of iron. Its top and sides are formed of a flat bar of iron, with spreading shoulders, and tenons below, the tenons passing through holes made to receive them, in the bed or table of the press; and holes are made through the lower ends of the tenons, to receive wedges, by means of which, the sides and top of the press-frame are securely bound to the table of it. The sides and top are formed, as before mentioned, of a single bar of iron; the top being flat, and having a circular hole in its centre, to receive the upper end of the stem of the screw of the press, and to steady and guide it; this smaller part, or elongation of the screw, being made cylindrical for that purpose. The sides of the press-frame are formed by the iron bar being bent at a right angle on each side, and prolonged until they reach the table of the press, and are secured by the wedges underneath it, as before mentioned. A cross-bar is passed through holes, formed in the sides of the press to receive the ends of it, at about one-third part of the height of the press, and is firmly secured by screws and nuts. The female screw of the press is formed in the centre of this cross-bar, which is thickened or strengthened there for that purpose; and two diagonal stays or braces pass from the sides of it, and are inserted in the upper corners of the frame, thus affording a great resistance to the upward movement of the female screw. The screw has a fine sharp thread; and below it, cross holes are made through the solid part, to receive an iron pin or lever, by which the screw is turned either way, as required. Below these holes, the lower end of the screw is connected with the moveable iron plank of the press, by means of a garter-piece, in the usual manner, so as to hang from the end of the screw, and yet allow the screw to turn round within the central

aperture formed in its upper surface for that purpose. The ends of the moveable plank have gaps formed in them, which receive the sides of the press-frame within them, and thus the plank is steadied in its movements upwards and downwards.

A dozen thin walnut planks are placed upon the table of this press, and between every two of them a small paper book is laid, which is composed of two sheets of paper, or of eight quarto pages, and thus there are uniformly diffused among them nine books of paper. Finally, these thin walnut planks are surmounted by another of oak, of an inch in thickness, the same size as the smaller or thinner planks.

By the help of these instruments, we now proceed to paste the straw, prepared as above directed.

We first spread upon a smooth table a leaf of very thin paper, the size of the intended plate of straw. We then cover this paper all over with flour paste, by the aid of a proper brush, and we then paste upon it one straw after another, side by side, beginning at one edge of the paper, and thus proceed, taking care that the straws neither overlap each other, nor leave any gap between them; we then wipe them over with a proper cloth, in order to be assured that we have thus removed all the superfluous paste, and with a sharp scissors we cut off, not only those parts of straw which exceed the paper in length, but also a small slip of the paper itself. We then place this pasted plate under the first plank in the press, between the leaves of paper, and, by means of the iron pin or lever, placed in one of the holes made through the lower end of the screw, we give it a slight degree of pressure, taking care not to compress it too forcibly.

We then take another leaf of paper, and paste straw all over its surface, in the above manner, and place it beneath the second plank in the press, between the leaves of paper. We then withdraw the first pasted plate of straw from the press, and remove it from between the leaves of paper, and which can be readily done, because the paste has not become quite dry; we then leave the damp papers to become dry, and replace the sheet of pasted straw between dry papers. We next lay it between the two lowermost planks in the press, and give it a considerable degree of pressure.

We continue proceeding in the same manner until we have finished as many leaves of straw as the press will contain. We also change the papers at least once, and when all are finished, give them a powerful pressure, and do not touch them until the next day. We then unscrew the press, and remove all the plates of straw, which are then placed between the leaves of a large book.

Having thus procured a complete collection of plates of straw of all colours, in order that we may not be stopped in the completion of any works we may desire to make, we shall proceed to describe the methods of working it.

Manner of working the Straw.

The works in straw with which we are now occupied, are those *in*

relief, or more properly speaking, *in bas relief*. The manner of giving this relief to the designs is, by embossing them in moulds, by means of the press. But before describing these extraordinary works, it is of importance to make known the instruments which are indispensable thereto.

On the manner of making the Moulds.

In order to execute all kinds of work, it is necessary to have a great number of moulds. An example of a medallion will be sufficient to understand the mode of operating. Supposing that we would take the portrait of Charles the Tenth, we employ a five-franc piece. We likewise choose the newest piece which we can procure; we then take a plate of horn, well extended, flat, and polished on one side (the cutlers and comb-makers prepare these plates of horn.) We then cut it square, a little larger than the coin; we next heat strongly, but not red-hot, two plates of forged iron, each an inch thick, and larger than the horn plate, and place one of them under the press; these iron plates should not be heated so hot, however, as to burn the horn. Upon this hot plate we lay two or three pieces of thick pasteboard, moistened a little, and upon these we place the coin with its reversed side downwards, or that which bears the arms of France, from which we do not intend to take a mould; and upon the face of the coin, which is oiled a little, we place the polished side of the horn plate in such a manner, that the sides of the square should be upright, or correspond with the position of the portrait on the coin; upon these we then lay the other iron plate, heated in the manner above described, so as not to derange their position; we then lower the screw of the press, and squeeze them by degrees. The horn, on becoming heated, softens; we continue to press gently until we perceive that the thickness of the horn is diminished sufficiently to cause us to judge that all the parts in relief of the coin are well impressed into the horn; we then cease to press, and leave the whole to become cold, but do not unscrew the press until twenty-four or thirty-six hours afterwards.

When all is become perfectly cold, we release the press, and shall find a hollow mould of horn exceedingly sharp and well defined, without the coin being injured in the slightest degree.* We next pierce a hole at each angle of the horn plate, and fix short brass wire pins in each, riveting them firmly by blows of a hammer applied upon the back of the plate. These pins are tapered a little on the face side of the mould.

* The Editor has a horn mould in his possession, evidently taken in this manner, from an exquisite medal of Maria Theresa, two inches in diameter, and in which the most delicate markings of the hair, the embroidery, &c. &c. are admirably preserved. He met with this mould at a broker's shop in Somer's Town a few years since; it, no doubt, having been brought over from France by one of the emigrant priests, at the commencement of the revolution, and was evidently intended to have been employed in embossing straw in the manner described in this article. It however also forms an excellent mould for making casts in plaster of Paris.

The mould being thus prepared, we proceed to make a *force*, or counter-mould. In order to do this, we take several leaves of pasteboard, which we paste together one upon another, and whilst they are still moist, we apply them upon the horn mould in order to receive the impressions of the four pins, and then bore holes through the pasteboards, to correspond therewith, with a pointed instrument. We must employ at first a sufficient thickness of pasteboards so as not to endanger the pins, and add to them successively until the thickness of the force, or counter-mould, when laid underneath the press, shall exceed the length of the pins the eighth of an inch at least.

We then place the whole under the press, and squeeze them carefully, so as not to damage the pins. We also add to the thickness of the pasteboards, if necessary, and when it is become sufficient, we give a strong degree of pressure, and continue to increase it, until we have obtained a perfect impression from the mould in the pasteboards. Sometimes we are obliged to paste small pieces of paper upon the impressed side of the pasteboards, in order to fill the large cavities of the mould, which we could not otherwise accomplish; but every time that we make these additions, we should likewise paste a leaf of paper over the whole surface, in order to retain these additional parts in their places, which otherwise would be liable to become detached.

[TO BE CONTINUED.]

On improvements in the art of painting in Water Colours, by Mr. C. J. Robertson. *From the Transactions of the Society for the encouragement of Arts, Manufactures and Commerce.*

In the hope of being useful to the lovers of painting, I send you a specimen of a new method of painting in water-colours, the result of experiments pursued for some years, in the hope of enabling water-colours, in some measure, to compete with oil. How far I have succeeded in producing the force and brilliancy of an oil picture, the Society of Arts will be enabled to judge, from this copy of the splendid picture of Titian, in the National Gallery; but my method possesses some peculiar advantages in durability, and in a facility of cleaning, which are, I do not hesitate to assert, superior to oil; and as also in a picture painted in this manner, not requiring a glass, as it may be cleaned with alcohol at any time, as often as you please, and without suffering the slightest injury; and every one knows, who is at all acquainted with the subject, that alcohol will instantly and entirely remove any dirt, that a picture may be subject to receive; but it is used with considerable danger to paintings in oil. I have paintings by me, which have been painted several years, and always exposed to light and air, and which, nevertheless, have not undergone the slightest change; and the method may be applied to paintings on a much larger scale, with, I have no doubt, equal success.

The paintings before you (a copy of the Bacchus and Ariadne, by

Titian,) is painted on what is called Bristol-board, or paper, attached with glue or paste to canvass, and which is again effectually protected from the action of the atmosphere, known to corrode the canvass of oil paintings, and also from any injury arising from humidity, by attaching tin-foil, by means of paste, to the back of it.

After drawing in the outline purely and carefully (by purely, I mean, in a single, clean, and sharp line,) with a black-lead pencil, rather hard, that the black-lead may not disturb the purity of the colours, I wet the paper all over with water, in which a small quantity of ox-gall is dissolved, and then lay a foundation tint, of finely-ground blue-black* (with the usual portion of gum arabic,) to represent the shadows and half tints, laying them on in succession, and carefully adhering to the contours, without softening their edges, the first tints rather faint and covering all but the extreme lights; after I have laid in several gradations, I take a large soft brush, and plenty of water, and wash off as much as will come away, taking care always to leave the lights clean; I repeat this, washing in and washing out, till the shadows *appear* as strong as the picture is intended to be, and no more will wash off; the half tints ought to be much stronger than may appear necessary, as they lose their apparent depth of tone in a remarkable degree, when the other colours are applied. When the foundation tints are nearly dry, I then lay on the carnation tints of the flesh with *madder lake*,† which is perfectly durable, and wash off in the same manner till it is not to be removed by washing; when these are strong enough, I wash on, in a very dilute state, yellow (stone) ochre, or raw terra di Sienna; in the brown flesh, burnt terra di Sienna: this, if done decidedly and with sufficient force, will bring the flesh nearly to its effect; the stronger shadows are given with Vandyke brown, burnt umber, or raw umber, mixed with madder purple, madder brown, or Indian red, according to circumstances; these last need not be washed off again. When I have got the whole picture to as much force as it can be brought in the usual way, the whole drawing should be washed over with a thin solution of gum tragacanth‡ in water, with a large brush; in doing this, care must be taken not to repeat the stroke in the same place till it is dry, and not to leave it in masses any where, as that would occasion a streakiness. The best way of doing it is, to lay it on in parallel strokes, the latter ones always touching the edges of the former ones; this operation may be repeated several times, allowing the paper to dry in the intervals, and it affords an excellent surface for working on, and will bring out the colours in a surprising degree, and yet without giving the smeared appearance, like the traces of snails, that gum arabic gives. The picture must now be worked up to its greatest strength, always co-

* For the satyrs, and browner figures, I used Vandyke brown, and the colours may be sepia, or any others that may suit the picture; but I think these three will answer every purpose.

† For the flesh of women and young persons; for others, Indian red, and Venetian red.

‡ It is better also to add a small quantity of gum arabic to it.

vering it with the solution of gum tragacanth, till it appears finished; it must then be varnished over with a solution, in spirit of wine, of isinglass previously soaked in distilled water. This will increase the strength, brilliancy, and durability of the picture, and as dry isinglass is not soluble in spirit of wine, except at the boiling temperature, so it is evident that it may be cleaned with cold alcohol with impunity.

The trees in the specimen are painted in body colours, to show how capable they are of being united with the other parts; and indeed any part of the picture might have been painted in body colours. In general, I paint all except the flesh in body colours, varnishing it first with the solution of gum tragacanth, and finally with isinglass. By using all the colours separately and unmixed, except for the dark shadows, the colours appear so much brighter, that none of the bright colours that are at all doubtful need be used: in this drawing, with the exception of the madder colours, they are all earths; no yellow brighter than yellow ochre being necessary. The lights will thus always maintain their purity, and the dark tints their full depth, which is not the case in oil, where the former grow darker, and the latter become mealy. The varnish necessary to bring out the dark tints again, becomes gradually opaque, and must, after a time, be taken off, with considerable danger to the picture, even in skilful hands.

This method is, therefore, particularly calculated for perpetuating valuable pictures in copies, as I am thoroughly persuaded it undergoes no change at all.

Method of manufacturing Melting Pots for Iron and Steel. *By* Mr. C. S. Smith.

[From the Transactions of the Society of Arts.]

The failure of a pot is a serious inconvenience, both on account of the loss of time and of metal, as well as of the interruption which it creates. Great variations are observable in the duration of pots from different makers, and even in those by the same maker; arising not so much from difference in the materials employed, as from a difference of skill or care in mixing the ingredients, and in the other parts of the manipulation. Whenever a bubble of air is left in the clay after being tempered, a pin hole in the pot made of such clay will be the common result, for the pressure of the melted metal will probably force a way through this weak part.

In order to submit the pots made by Mr. Smith to a very severe trial, one was kept constantly in work for two days and the intervening night; during which time it received twenty-three charges, of 70 lbs. each, of cast iron. Another pot was worked for three successive days, being raked at night in order to prevent it from cooling; under this management it received eighteen charges of cast iron, of the same weight as the former.

Neither of the pots had cracked or leaked in the least, but were now become unserviceable from the lip having been worn down into the side, in consequence of the necessity of knocking away the scoriæ after each fusion, which could not be done without breaking down a little of the lip.

The pots made by Mr. Smith are composed of the three following ingredients:—Stourbridge clay, coke, and plumbago, or black lead, as it is usually called.

Stourbridge clay comes to market either ground or in lump; the price charged for each is the same, and therefore the latter is to be preferred, as less mixed with impurities. A convenient quantity of this clay is to be put on a sieve ¼th of an inch in the mesh, and is to be carefully hand-picked, all pebbles and other impurities being thrown aside; it is then sifted on a board and put into a bin. Those pieces which will not pass through are transferred to a mortar with a spring pestle, in which they are pounded till they are fine enough to pass through the fine sieve, the meshes of which are ⅛th of an inch wide. This fine clay is put in a barrel by itself.

The coke is thus prepared:—the masses, in the state they come out of the oven (for gas coke is of inferior quality,) have their tops and bottoms knocked off; the middle part only, which is of a uniform firm texture, being reserved for use. The coke is now to be pounded, taking care so to manage, by moderating the blow of the pestle, that as little dust as possible may be made. When duly pounded, it is to be thrown on the fine sieve, and all that passes through is to be rejected; it is then to be transferred to the coarse sieve, and what comes through is now of a proper size.

The plumbago is Mexican, and is to be reduced to a very fine powder.

The board called the *walking* board, on which the mixing and tempering the ingredients is performed, is six feet square, having cross pieces on the under side to raise it about an inch from the ground. The process commences by mixing on the coarse sieve eight quarts of clay and five quarts of coke, and sifting them together on the walking board; here they are to be still farther mixed by hand, till the mass appearing uniform, it is to be collected in a heap: *clean* water is then to be added and stirred in, so as to make the mixture of the consistence of mortar. One treader, or, for expedition sake two, is then to get on the board, and is to tread the mass well with his naked feet, working it chiefly with the heels: when trodden, it is to be turned over, or thrown with a spade, and is again to be trodden, alternating these two processes for about twenty minutes.

Then mix on the fine sieve four quarts of finely pounded clay, and 2 lbs. of the pounded plumbago, and sift a little of it over the mixture on the board; tread and throw it as already described, then sift on more of the fine clay and plumbago; and proceed in this manner till the ingredients are thoroughly incorporated, and the air has been all trodden out. The mixture should remain a night in lump, and the manufacture of melting pots from it may begin the next morning.

The apparatus consists of a four legged board, called a horse, for the workmen to sit on, having near its fore end two uprights supporting a cross board, through which a round hole is made, capable of receiving the stem of the plug or core. Perpendicular to this hole is a socket for the reception of a pin that terminates the stem of the core, and tends to keep it upright and steady; the core, fixed on the top of the stem, and therefore an inch or two above the cross board, is a cone as large as the cavity of the melting pot, with a border below to regulate the thickness of the pot. The best dimensions for the horse are 3 feet 6 inches in length, 9 inches in width, and 3½ inches in thickness: it should be raised sufficiently high to allow the workman to sit on it with his feet resting on the ground, and the part where the thighs press should be rounded off and curved in a little. The cross board, which receives the stem of the core, should be raised 6 inches above the horse; and upon it is erected the square or gauge, 18 inches high, and 10 inches in the blade. The cap of the core should be of basil or thin sheep skin.

Every thing being ready, the core is first to be rubbed well with plumbago, to prevent the cap from sticking to it; the cap is then to be put on the core, and a piece of the mixed materials, or *walk*, as it is technically called, large enough for the melting pot, is to be cut off from the mass. A pot capable of holding 70 lbs. of cast iron, requires 16½ lbs.; one of 35 lbs. of brass, requires 10 lbs. The piece is to be worked and beaten up well on the walk board, and is to be carefully made into a lump, which, a hole being then made in it, is to be fixed on the top of the core. The workman then takes a flat piece of board 4 inches square, with a handle, called a *flatter*, and strikes it, beginning at the top and bringing down the clay gradually till it has got as low as the rim at the bottom of the core. During this, the stem of the core being grasped by one hand and turned gently round, the core itself, with the clay on it, is brought successively under the action of the flatter. Great care is to be taken during this operation, that no air gets into it, or, if any bubble should appear in the clay, it is to be cut out with a knife. The bottom of the pot is now to be beaten quite flat, making it of the proper thickness by the gauge, and observing that the core is not made to rise from its socket by any clay getting under the bottom of the core; for the consequence of this would be, that the bottom of the pot, though regulated by the gauge, would be too thin by all the rising of the core. The workman now dips one hand in water, and presses the pot, rubbing it from top to bottom, while the other hand is turning round the core. The effect of this is, that the pot becomes of a uniform thickness, not varying in any part so much as one-sixteenth of an inch. Finally, the pot is to be smoothed all round as well as the bottom, and the process is completed. The first pot of each day's work should be cut up with a knife to ascertain that there are no air holes, and that the tempering has been properly performed.

A soft, new made pot, might get out of shape by being handled; the core, with the pot on it, is, therefore, taken off the horse, and carried to a quiet sheltered place, and the pot being then set on its

bottom, the core is raised out, leaving the cap within, which itself parts from the pot with a little management. The lip is then made by pressing the handle of the trowel from within against the edge of the pot, having placed the fore finger and thumb, one on each side of the edge, to limit the action of the pressure.

It is by no means an unnecessary precaution to put the new made pot in a quiet place, for if subject to any considerable jarring before it gets dry and hard, the pot will sink and not carry its rated charge of metal.

From twenty to thirty-six melting pots, of excellent quality, may thus be made in a day.

Report on Fulminating Powders capable of being used as priming for Fire-arms. *By* Messrs. Aubert, Pelissier, *and* Gay-Lussac.

[From Annales de Chimie, xlii. September 5, 1829.]

A great number of powders which fulminate by a blow are known; but, with respect to their application to fire-arms, those of chlorate of potash and fulminating mercury alone deserve particular attention, the others presenting too many inconveniences or dangers in their preparation and employment.

Powder with Chlorate of Potash.

This powder is an intimate mixture of sulphur, charcoal, and chlorate of potash. The sulphur or the charcoal may be suppressed on substituting other inflammable substances; but the powder then loses more or less of its power. At the suggestion of Berthollet, the discoverer of chlorate of potash, the manufacture of this powder was begun, 1786, at Essone; but an explosion, followed by the most serious accidents, soon occasioned it to be given up. This powder is stronger than the best powder made with saltpetre. It speedily renders the trial mortar unserviceable, by enlarging the chamber and producing deep cracks in it. Employed by M. Welter, at Meudon, to fill bombs which he caused to explode buried in the earth, it constantly broke them into uniform pieces of the size of a chesnut, whilst the pieces of other bombs, filled with common powder, and placed in the same circumstances, were much less numerous. This powder might, consequently, be employed with more advantage than common powder, for filling bombs, forcing gates, blowing up bridges, &c.

The property which it possesses of being inflamed by a blow or stroke, determined its application, as priming, to percussion guns; but it soon gave place to fulminating mercury, on account of several inconveniences attending it, the principal of which are, to cause great foulness, and to have a corrosive action on iron. As this last property might depend on the sulphurous acid produced during its decomposition, we endeavoured to neutralize the effects of the acid, by mixing with the powder suitable quantities of dried carbonate of soda. The experiment had the desired success; but the powder

lost, by this mixture, much of its inflammability, and, besides, we soon discovered that the chloride of potassium, resulting from the decomposition of the chlorate of potash during inflammation, speedily corrodes iron in a damp air. This is a great inconvenience inherent in powder made with chlorate of potash, and it does not appear to us to admit of an easy remedy.

We think it useless to insist any longer on the qualities of this powder, the use of which is discontinued, and shall confine ourselves to say that, if it were determined to employ it in the artillery for some particular purposes, the manufacture and carriage of it might, with suitable precautions, be effected without danger.

Howard's powder, or fulminate of mercury.

This powder is at present generally employed for the guns of sportsmen, on account of its easy inflammation, and its inaction upon iron. It is a salt formed of oxide of mercury, and a peculiar acid composed of one atom of azote, one of oxigen, and two atoms of carbon. Since the composition of this powder has been known, it has been named *fulminate of mercury.* When it detonates by a blow or by heat, the mercury is set at liberty in the state of vapour, as well as the azote; and, from the carbonaceous deposit observed on the surfaces on which it has been made to detonate, it is very probable, that half the carbon which it contains, forms, with the oxygen, carbonic acid, and that the other half is deposited or dispersed. In this supposition, 1 gramme of fulminate of mercury would give 0.155 litre of gases permanent at the temperature of melting ice, and under the pressure of 0.76 metre; but this volume, at the moment of explosion, is much more considerable, because it is dilated by heat and mixed with mercurial vapour. A gramme of common powder yields nearly a double volume of elastic fluids.

The revivification of the mercury in a state of vapour would be a very serious inconvenience, if the fulminating powder used for priming were in greater quantity than that now employed; because the mercurial vapour is disagreeable to the smell and injurious to health. Sportsmen, it is true, have not yet made any complaint of this inconvenience, but it exists, nevertheless; and before adopting into the military service fulminating priming powders, it would be prudent to examine them with respect to the influence they might exert upon the soldier in consequence of the inconveniences just mentioned.

Detonation of fulminate of mercury by a blow.

We shall examine this property, the fulminate being either perfectly dry, or very damp.

The fulminate, when dry, detonates very readily, by a *blow* of iron upon iron, a little less readily by a blow with iron upon bronze, still a little less by that of marble on glass, marble on marble, or glass on glass: it inflames, however, with sufficient facility in these different circumstances, for us to be almost sure of causing the explosion at every blow. The blow of iron upon lead inflames it but with great difficulty, and that of iron upon wood is quite ineffectual.

The fulminate always inflames easily by *friction*, especially by that of wood against wood. It detonates less readily by that of marble on marble, than of iron upon iron, and, lastly, of iron upon wood or marble. The fulminate which has been pulverized detonates with more difficulty, particularly by friction, than that which is in crystals.

Moistened with five per cent. of water, the fulminate loses a great deal of its inflammability. It detonates, however, with the blow of iron on iron, but the portion struck burns alone and without flame, without communicating the inflammation to that which is not struck. The friction of wood upon wood produces a similar effect. But inflammation was not produced in the experiments by the blow of marble on marble, nor by the friction of marble on marble, or on wood. The fulminate, inflamed by a heated body, melts with the same slowness as common gunpowder moistened with fifteen per cent. of water.

If the fulminate be mixed with ten per cent. of water, it will be still more difficult to inflame it. It disappears, however, by a blow of iron upon iron, but without flame and noise. The part struck burns alone and projects the other. Moistened with thirty per cent. of water, it still sometimes detonates under the mullar, (wood on marble) during the manipulations; but the detonation is partial, and is not communicated to the rest of the mass: the mullar is merely raised under the hand of the workman, and no accident ever results from it. These experiments afford the certainty, that by operating on the fulminate mixed with water, explosions will be little to be dreaded.*

Effect of the explosion of the fulminate of mercury.

The character of the powders eminently inflammable, is to detonate at the moment of their inflammation, even when only very small quantities are employed, and to act on surrounding bodies as a moving power actuated by a great velocity. The best made common powder is extremely far from having such a rapid inflammability as fulminate of mercury, and especially as fulminate of silver; and no fire-arms loaded with either of these fulminates, with the same charge as common powder, can resist their action, although the volume of elastic fluids produced in the first case is smaller than in the second.†

* According to the new arrangements adopted in the manufactory of priming powders, situated in the plain of Jory, near Paris, since the explosion which entirely destroyed it, more than two hundred millions of caps have been manufactured in that establishment, without any other accident than a piece of marble broken under the mullar, as above mentioned.

† Whatever charge of the fulminate of mercury may be put into a fire-arm made with the known metals, it will speedily be destroyed; for, during the charging of the primings or matches with the fulminate weakened with common powder, the punches of tempered cast steel, with which that powder is pressed to the bottom of the capsules, are speedily furrowed by the explosions which occur every moment, although the gases produced have a free passage by the sides of the punches.

Thirty grammes of fulminate of mercury inflamed in a small box of card, on the head of a barrel standing loosely, made a hole through it without breaking it, as a ball would have done from a four pounder. The noise of the explosion seemed much louder than the report of a musket.

The same quantity of powder, inflamed in similar circumstances, made scarcely any report, did not break the bottom of the cask, nor did it even shake it.

Twenty-five grammes of fulminate of mercury put on a board placed upon the ground in the open air, broke it to pieces, and besides made a hole in the ground under the board. The same quantity of fulminate, placed on a barrel with the head out, of the capacity of a hectolitre, nearly (= 3½ cubic feet,) broke it to pieces by the detonation.

A small steel chamber three cubic millimetres in capacity, the sides of which were three millimetres in thickness, was often broken to pieces by the explosion of the fulminate of mercury which it contained.

Twenty-five grammes of fulminate of mercury, inflamed in the open air, communicated the inflammation to another portion of fulminate placed five centimetres (= 1.97 inch) off; but inflammation did not take place in another portion of fulminate at the distance of twelve centimetres (= 4.72 inches.)

If we place a train of it against another train of gunpowder on paper, and even one upon the other, and set fire to the fulminate, the gunpowder will be dispersed without leaving a trace of its combustion on the paper, and it may be found again almost entirely. If, on the contrary, we set fire to the gunpowder, as soon as the inflammation reaches the fulminate, the latter so instantaneous in its detonation, will still have time to disperse the rest of the powder before the inflammation can reach it, and no traces of the combustion of the dispersed part will be perceived. An intimate mixture of fulminate and of bruised gunpowder will, on the contrary, burn totally.

This result on the propagation of the inflammation by the fulminate, to such small distances, in open air, appears so much the more extraordinary, because, in the primings of fire-arms, this propagation, relatively to the quantity of fulminate, is incomparably greater, since it extends to more than a centimetre (= 0.39 inch,) and lieutenant colonel Châteaubrun has carried the inflammation to the powder, in a twenty-four pounder, through the thickness of the metal, by a chimney of ten points with ten centigrammes (= 1½ grain) of fulminate. But the results above stated are incontestible, and it will soon be seen that the anomaly which they present is not real.

[TO BE CONTINUED.]

Instructions relative to the Art of Refining; two memoirs published in 1827 *and* 1828. *By* M. D'ARCET, Assayer of the Mint, Paris.

THE art of refining is that of separating gold and silver from metals

of less value, with which they are combined. It has been practised from the earliest periods of the metallurgic arts.

The method formerly used was to melt the ingot of metal to be refined, with saltpetre, in order to separate the oxydable metals. It was then converted into grains, which were heated in earthen vessels, at first with weak nitric acid, and in a second operation with that which was more concentrated. The gold alone remained undissolved. It was collected, washed, dryed, and then melted with saltpetre. The acid liquids united, were placed in contact with plates of copper, which separated the silver entirely, which being washed, was melted with saltpetre and borax. The liquid nitrate of copper was evaporated, and then exposed to a heat capable of decomposing it. The oxide of copper was reduced by charcoal in an air furnace. In this operation the nitric acid, which is very expensive, was almost entirely lost—a great deal of saltpetre was used—the vessels employed were often broken, as they were unfit to resist the great variations of temperature to which they were exposed—deleterious gases and vapours were copiously produced—the waste was very great—and considerable expense was incurred in reducing the copper.

In the new process, nearly all these inconveniences are avoided. The ingot is melted and granulated without saltpetre—the grains are treated with sulphuric acid in large vessels of platina, at a high temperature, by which the silver and copper are dissolved. The gold being thus separated from the silver, is treated with fresh acid, then washed, dried and melted with a little saltpetre. The sulphate of silver is decomposed by plates of copper aided by heat, and the silver is washed, dried and melted with a little saltpetre and borax. The solution of sulphate of copper is saturated by adding oxide of copper, then evaporated and crystallized. In this process much labour is saved, and less expense incurred in saltpetre, acid, crucibles and charcoal; there is less waste, and the amount of saleable products is greater,—while, no other gases being disengaged than sulphurous acid with a little sulphuric, the operations are performed with less injury to the workmen.

The alloy most easily refined by sulphuric acid, ought, in general, to consist of gold, silver and copper, in nearly the following proportions.

Silver,	725
Gold,	200
Copper,	75
	1000

If the proportion of copper be much greater than the above, anhydrous sulphate of copper will be held in suspension in the solutions which prevents the gold from separating easily; and if the gold be in greater quantity, the alloy is not easily attacked by boiling sulphuric acid; the refiner should therefore previously analyze a small portion of the ingot, and add to the melting mass, some silver or copper, as the case may require.

If lead, or other base metal than copper, be present, it must first be separated, either by saltpetre or by cupellation.

Refiners, in general, employ 3 parts of sulphuric acid (sp. gr. 1844) for 1 part of alloy, of the foregoing composition,—varying the quantity of acid, however, with that of the relative proportion of gold or copper. The acid should be free from nitric or hydrochloric acid.

The only precaution requisite with respect to the copper, is, that it be free from lead or tin, as these metals form, with sulphuric acid, insoluble compounds, which would remain mingled with the silver. In general it requires 28 parts of copper to precipitate 100 of silver, and this furnishes from 100 to 104 parts of crystallized sulphate of copper.

The *platina boilers* employed at Paris, were constructed by M. Bréant. They hold about 11 gallons, weight 18 lbs. and cost 8500 francs. They are surrounded by an iron defence, which serves to transport them, and prevent injuries. Fine gold, at the moment in which it is separated from the alloy, by sulphuric acid, is in very fine powder, which coming in contact with the platina, under the influence of boiling acid, is easily soldered to the platina, and requires to be detached from time to time, by the action of a little weak aqua regia, which dissolves the gold without attacking the platina.

[*Bib. Univ. Avril*, 1829.

On the Elastic Force of Vapour at high Temperatures.

A COMMITTEE, appointed by the Academy of Sciences, has been engaged in carrying on experiments to determine the elastic force of vapour at high pressures: the labours have principally devolved upon MM. Dulong and Arago. The results have been obtained experimentally up to 25 atmospheres, and extended to 50 by calculations. That no error dependant upon the use of valves should interfere, it was resolved to estimate the force exerted by the columns of mercury sustained. A glass tube was therefore prepared by MM. Thibaudeau and Bontemps, consisting of 15 pieces, 2 metres (78.74 inches) each in length, 5 millimetres (0.2 of inch) in diameter, and the same in thickness. Each piece was sustained by counterpoises, so that the lower should not be crushed by the upper, and the whole was erected in a square tower, which is the only remains of the ancient church of St. Genevieve.

Fearing that if the steam from a boiler were made to act directly upon such a column of mercury as this tube would sustain, it might, from intermission of its force, occasionally produce such sudden agitation in the metal as to endanger the safety of the whole, it was resolved to form a kind of manometer, in which the compression of a given volume of air should be ascertained, first, by the column of mercury, and afterwards used as a measurer of the elasticity of vapour at various temperatures. In this way the estimations would be as accurate as if made directly by the column of mercury. The

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preparation of this instrument gave an opportunity of examining the law of Mariotti, namely, that all gases are compressed in volume in proportion to the energy of the compressing force. Boyle and Muschenbroek thought they saw errors in this law, even when the force was not above 4 atmospheres. Robison and Sulzer carried the force to 8 atmospheres, and agreed in giving the same departure from the law, namely, that when compressed eight times, instead of exerting a force eight times that of the common air, it was only six times greater. Oersted, on the contrary, found the law true to 8 atmospheres, and even up to 60 atmospheres; but this mode of experimenting is not satisfactory to the French commissioners, though the results were correct.

In the preparation of the manometer the experiments were carried to 27 atmospheres, and the law found to be *correct*. It was intended to ascertain if it held good with other gases than air, but the authorities forbade the use of the old church tower for this purpose.

There appears to have been much fear about steam at the pressure of 24 or 25 atmospheres; and, lest the boiler should explode, and blow up the old vaults, and even destroy neighbouring buildings, it was determined to have it in the court-yard of the observatory, and make the experiments there. Ultimately, therefore, the manometer was transferred, though with great difficulty, and finally placed in proper communication with the boiler.

Some important precautions were now taken to ascertain the temperature accurately. The first was to take account of the cooling effect of the air on that part of the thermometer exterior to the boiler; this was done by retaining it constantly at the same temperature. The next was to prevent alteration in the capacity of the bulb, by allowing the vapour to press upon it. This was effected by putting the thermometers into gun barrels, made thin, closed at one extremity, and filled with mercury; these, when fitted to the boiler, were made to descend, one to the bottom of the boiler nearly, to give the temperature of the water; the other to within a few inches of the water, to give the temperature of the vapour.

The temperature and pressure were then experimentally ascertained up to 24 atmospheres; after which formula was sought for, by which they could be extended to higher pressures, and the following one adopted:

$$e = (1 + 0.7153\ t)^5$$

e being the elasticity; t the excess of temperature above 100° C, taking for unity 100° of the centigrade thermometer. This formula nearly represents the results given by experiment up to 24 atmospheres; the greatest error has been at 8 atmospheres, and was then 0.9 of a degree. It was more accurate for the higher pressures, being calculated from them, and the commissioners have no doubt that at 50 atmospheres the error is not more than 0.1 of a degree.

Elasticity of the Vapour taking the Pressure of the Atmosphere as Unity.	Temperature. Centigrade.	Fahrenheit.
1	100.	212.
1¼	112.2	233.96
2	121.4	250.52
2½	128.8	263.84
3	135.1	275.18
3½	140.6	285.08
4	145.4	293.72
4½	149.6	301.28
5	153.8	308.84
5½	156.8	314.24
6	160.2	320.36
6½	163.48	326.26
7	166.5	331.70
7¼	169.37	336.86
8	172.2	341.96
9	177.1	350.78
10	181.6	358.88
11	186.3	367.34
12	190.0	374.00
13	193.7	380.66
14	197.19	386.94
15	200.48	392.86
16	203.60	398.48
17	206.57	403.82
18	209.4	408.92
19	212.2	413.96
20	214.7	418.46
21	217.2	422.96
22	219.6	427.28
23	221.9	431.42
24	224.2	435.56
25	226.3	439.34
30	236.2	457.16
35	244.85	472.73
40	252.55	486.59
45	259.52	491.14
50	265.89	510.60

The members of the committee remark, that they could find only one English table of the force of high pressure vapour; it had been given to M. Clement by Mr. Perkins, but it was found sadly erroneous: for instance, at the temperature of 215° C. or 419° F. the force in it is given as 35 atmospheres, whereas it is really only 20, or little more than one-half. In Germany a table has been constructed by M. Arzberger, of Vienna, which rises to 20 atmospheres, and is much nearer the truth than Mr. Perkins'. It is about 3 atmospheres wrong at the highest pressure.

[*Bib. Univ. and Silliman's Journal.*

Description of an improved mode of making Lithographic Transfers.

By J. Netherclift.

Lithographic drawings were originally made with a peculiar ink, on paper covered with a coat of size, and were then transferred to the stone by warming this latter, laying the drawing on its face downwards, and passing both through a rolling press. Hot water, by means of a sponge, or in any other convenient way, was then applied to the paper, till the coat of size on which the drawing had been made was reduced to a soft, pulpy state, which allowed the paper to be stripped off, leaving the drawing fixed, by the previous pressure and heat, to the face of the stone.

Many advantages attended this original method, compared with that which has now nearly superseded it, namely, making the drawing on the stone itself; for, in this latter mode, the artist works on a cumbrous, unportable slab, and is obliged to make his drawing in an inverted position; whereas, by the use of prepared paper, he had a light and portable material, together with the great advantage of making his drawing in a natural position, which, being that to which artists are accustomed, the work was free from stiffness and constraint.

The objection to the method by transfer, was, that the lines were coarse, and only adapted to free sketches, being deficient in that fineness and precision required in most works of art, especially those intended for illustration of objects of natural history, or as specimens of the higher department of art. The drawings of all such objects are made on the stone itself. The Society of Arts, conceiving that it would be a great point gained so to improve the ink and paper, and generally the whole method of making lithographic transfers, as to render it applicable to most of the purposes for which drawing on the stone is now had recourse to, offered a premium for this object, which was successfully claimed by Mr. Netherclift. The society do not suppose that Mr. Netherclift's process is incapable of improvement; but, from the specimens produced before them, and from the unanimous testimony of several very competent judges, they believe that the process which they now make known will be found to produce work of a very superior quality to the lithographic transfers which have hitherto come under the notice of the public.

Composition of Materials.

The transfer paper is thus made:—

Take the proportions as follow:—A quarter of a pound of tapioca and arrow-root; boil them separately into a paste, and then unite them, and pour sufficient hot water to make the whole a thin paste, which must be strained through a muslin rag: add to the above a quarter of a pound of flake white, previously well ground in water, and stir it in with the paste. The paper, either thick or thin, should be rather porous, or what is called half-sized paper. First, with a flat camel's-hair brush lay a coat of common size on the paper, and let it dry in; then lay on the paste in the most careful and *even*

manner *thrice* following, but dried between each time of laying on. Thus the whole surface will be properly covered: if there should be any part omitted, the work on it will be imperfect. As soon as the paper is dry, it should be either well *cold pressed*, or sent to the glazing-mill and flatted between iron rollers, which clears the surface, and the glazed part should be on the back side of the paper, which is done by rolling two sheets together face to face. The work on the paper is, if fine, executed with a steel pen, as the specimen herewith sent, the dark parts with a common crow-quill.

The ink is composed of equal quantities of yellow soap and shell-lac, boiled and burnt together, with lamp-black sufficient to make it black, which forms a cake, to be rubbed up, as Indian ink, with warm or cold water. I prefer to use no tallow or bees'-wax, and am prepared to show that the art of lithography, as connected with ink-work, is not founded on the opposite qualities of acid and grease; for the above ink requires no acid to neutralize the alkali of the soap, the grease of which is fixed by the extreme quantity of shell-lac; thus the acid is avoided, and the lines are not so liable to be injured. In extreme cases, however, where a mass of shade is condensed, a little acid may be used with effect. Niric acid, diluted with water, is the proper article.

The act of transferring is easy:—Let the stone be moderately warmed; damp the back of the paper on which the work has been executed till it lies perfectly flat; take care no *wet* touches the work; lay the paper carefully on the warm stone, and on it lay flat soft paper, which will absorb the wet on the back of the transfer paper. Pass it through the press three or four times with increased pressure, after which this paper will peel off, leaving the composition as well as the drawing on the stone. Wash off the former, and rub the drawing over with a strong coat of gum-arabic water. Lay it by till cold, and print. [*Register of Arts.*

On the so termed French Glass-Paper, and a substitute therefor. By Thos. Gill, Esq.

We have received from France, of late years, thin transparent sheets of this substance, and which have been found by artists to be greatly preferable to any tracing-paper hitherto employed by them. It is evidently a preparation of gelatine, most probably, bone-glue, and seems to have been formed by pouring a solution of it upon plates of polished glass, and leaving it to become dry. We are not aware that it has hitherto been prepared in this country.

Mr. W. Kelsall, the ingenious engraver, whose method of taking casts of medals in plaster of Paris has been given in the Technological Repository, has, we are informed, employed this glass-paper, in making tracings, in the following novel manner. He places it upon the original design which he wishes to copy, and to transfer, in a reversed position, to the surface of the etching-ground, laid upon his copper or steel plates; and, with a fine etching-needle, and light

and even strokes, he draws the outlines of his subject upon the surface of the glass-paper. This done, he rubs over it some patent calomel, which enters into and fills up the lines so drawn; the remainder being carefully removed from the surface of the glass-paper. He then places the surface of the glass-paper thus treated in contact with the etching-ground, and secures it from slipping; and then, by dexterous light blows upon its opposite surface, he transfers the calomel from the slight incisions made in the glass-paper, to the etching-ground upon his plate.

This material, although excellent for the purpose described in the foregoing account, being, however, scarce and expensive, the editor thinks it will be acceptable to artists, to be informed of other means of procuring similar, and even more important, results.

Many years since, a person submitted to the Society of Arts, a method of drawing perspective representations of objects, and of transmitting them to the surface of paper. His method consisted in coating the surface of a piece of plate-glass with a solution of gum arabic, and letting it become dry. This glass he then mounted perpendicularly, by placing it in a groove made to receive it in a wooden basis, and which also carried a sliding arm, which supported a metal plate, having a small orifice in its centre, to serve as an eye-piece. The outlines of any object were then to be traced upon the gummed surface of the upright glass, with a fine needle, fixed in a proper handle; the eye of the artist being at the same time applied to the orifice in the eye-piece; and thus a perspective outline of the object might be readily drawn in the thin coat of gum. The glass plate being removed from its stand, the lines traced in the gummed surface were then to be filled with copperplate printing ink, which was wiped off the surface as usual. A moistened paper being then laid upon the inked surface, the outlines might be transferred therefrom to the paper, by burnishing the back of it with any proper and smooth instrument. The editor put this method to the proof, and thus obtained the outlines of the object he drew upon the gummed surface of the glass, transferred upon the paper. The success of the experiment was not, however, sufficient to merit the reward of the Society.

Now, he would suggest, that a thin plate of glass, coated either with a solution of gum arabic, or with a mixture of gum arabic and isinglass, or simply with one of isinglass, might be substituted for the French glass-paper with every prospect of success; and the outlines of any object traced upon it, might be filled with calomel, be reversed, and transferred to the surface of the etching-ground, in the manner done by Mr. Kelsall, and as above described; and when done over with, a fresh coat of gum, &c. would render the glass again fit for service.

We also think that a thin plate of lantern-horn might be conveniently employed as a substitute for the French glass-paper, and at a much cheaper rate; although it would not possess the great advantage of the capability of being used repeatedly, which the prepared glass plates do. [*Tech. Rep.*

Some account of the Oil expressed from Cotton Seed; extracted from a letter addressed by Gen. D. R. Williams, *of South Carolina, to* Messrs. Follet *and* Smith, *of Petersburg, Virginia.*

We have previously given some account of the patent obtained by Mr. Francis Follet, for a machine for hulling cotton seed, and also of some improvements subsequently made in that machine by himself and Mr. Jabez Smith. The object of hulling is to get rid, not merely of the hull, but of the fibres of cotton which adhere to it, and which would absorb and retain a large portion of the oil, under the press. When it is known that the seed weighs about three times as much as the cotton which surrounds it, an estimate may readily be made of the immense produce of this article in the southern states. Not long since, those who had cotton gins, felt themselves obliged by any neighbour, who was willing to take the seed away, and what might have produced *millions* of dollars, has been rejected as of no value. We sincerely hope that Mr. Follet may at length be remunerated for the series of sacrifices, and the indefatigable exertions which we are aware he has made, and that he may have the gratification of knowing that he has become the founder of a manufacture of great national importance. Of this gentleman we have no personal knowledge, but are sufficiently acquainted with the history of his machine, and so well convinced of its real value, as to feel a high degree of interest in the general introduction of the one, to the great benefit of the other. [Editor.

Society Hill, 13th May, 1830.

Gentlemen—Your favour reached me in due course of the mail. I have not replied earlier, because as our oil mill was so nearly finished, I preferred to delay the acknowledgment, till I could speak from facts, resulting from my own experiments; and although these have not been carried out as far as I propose, they are quite enough so to satisfy my own mind fully. In relation to your "cotton seed huller," I am gratified to be able to say, it performs all that you have promised for it, and is, moreover, most easily comprehended; ours has been set up and put into operation by persons who never saw one before. Our oil mill is after the Dutch mode, of pestle and wedge. Our grinding stones are not quite four feet in diameter, and 12 inches thick. The cotton seed kernels are so much easier to grind than flax seed, these stones, small as they are, may easily grind for two pair of pestles and wedges. That the whole process is simple and not difficult to understand, you will infer, when I tell you, that no person concerned about ours, except myself, has ever seen an oil mill before. You are aware that I attempted last winter to enlist the public generally in favour of your invention, by a few pieces in the Columbia Telescope, signed "a Cotton Planter." These were founded on information, with which I had been favoured. You may be certain of the satisfaction I feel in having tested by actual experiment, that all those statements were perfectly correct. In rela-

tion to the uses to which cotton seed oil may be applied, it is almost superfluous to include *painting*, as that fact is fully settled: the same process which is indispensable to make flax seed oil dry, produces the same effect with this. There are good judges who pronounce it to have a better body, and to be, therefore, superior: considering to what extent the adulteration of linseed oil has been carried, owing to the decrease of material, it is not hazardous to say the cotton seed oil *ought* to be preferred. Without resorting to any of the patented methods of refining oil, I have succeeded, by a simple and cheap process, in refining ours, so as to answer all the purpose of the best sperm. oil, in our cotton factory. Our superintendent, Mr. Hopkins, has been very careful to compare it with as good sperm. oil as I ever saw, and is entirely satisfied of its equality with it. In its present state, we find it burns very well by a little attention to the wick; by other means than those I have as yet used, I am satisfied it will be much superior to the best animal oil for lamps, it being entirely inoderous, a circumstance of great importance in establishments requiring a great many lights. The residue of the kernels, after the oil is expressed, called oil cake, is excellent for stock generally; particularly for milch cows and pigs. If your invention could do nothing more than to convert cotton seed into wholesome food for stock, it would still be, in my opinion, of infinite importance to the whole southern country. The planter who makes four bags of cotton to the hand, will now, with your aid, have, in addition to his grain, forty bushels of good food also per hand, more valuable than that quantity of oats. In New England it is preferred, pound for pound, to oats. No man is so dull, as not to see that the consequence to his *people* and his *purse*, must be alike agreeable, it being a self-demonstrable proposition, that there is no scarcity, where milk and pigs are abundant.

The only use to which cotton seed was applied, previously to the invention of your hulling machine, was for manure. The same quantity fed to stock may, with the ordinary care that every planter is competent to bestow, elaborate ten times the quantity. Thus much for facts: you will not consider me an enthusiast, when I add, I have not the slightest doubt, that the time will come, when, owing primarily to your invention, cotton seed oil will also enter largely into the food of man. From these considerations, I earnestly hope you may receive a very handsome remuneration for your discovery; more you ought not to ask. Do not, like Miller & Whitney, attempt to "kill the goose for the golden egg." A fair price the community will be willing to give, more will produce for you trouble, vexation, and probably defeat. Let me also advise you not to despair of a just reward, because it may be slow to reach you. All communities change their habits slowly; ours is at present prejudiced against inventors. My best days have been spent in attempts to improve the agricultural and mechanic arts; except a few implements of husbandry, I have no reason yet to believe I have in its opinion added any thing to society, but in two instances. I was the first person who attempted the use of mules, certainly in the South-

ern states, if not in the United States, for the purpose of agriculture. If I had then been as easily laughed out of countenance, as most young men, I should have given it up in despair, for I was ridiculed by old and young. I have lived to see the only limit to their use, is, the circumstances of the planter. I first attempted to dam out the inundations of the Pee Dee, and consequent thereon had well nigh been deprived of a seat in congress, because it was thought, any man who believed "he could keep the fresh from his low grounds, was too big a fool to go to congress." Now there is nearly as much swamp lands reclaimed from freshets in South Carolina, as on the Mississippi. These facts may serve to encourage you, for however slow the community may be in giving its confidence, it does not always refuse it.

Respectfully yours,

DAVID R. WILLIAMS.

Test of the Strength of Chlorine, or Chloride of Lime.

THE solution of indigo, which has long been employed in estimating the quantity of chlorine in any fluid, is found to be uncertain, or at least inconvenient, on account of the variable quality of indigo, and also of the changes of colour which a dilute solution of indigo in sulphuric acid spontaneously undergoes. If the solution be concentrated, the sulphuric acid expels the chlorine too rapidly from its solution, and thus prevents a portion of it from reacting on the indigo. *Muriate of manganese*, proposed by *A. Morin*, is a more certain and preferable test. He has been able to appreciate the half of a hundredth part of chlorine by this reagent, and nothing is more easy, he remarks, than to prepare it in determined proportions, and to preserve it unaltered for a long time. To prepare this chlorometric fluid, it is sufficient to dissolve some oxide of manganese in hydrochloric acid, taking care to have an excess of the oxide. Filter the liquid, which is of a pale rose colour, and scarcely reddens litmus. A single drop of a weak solution of subcarbonate of soda, produces in it a white precipitate, which does not disappear by agitation. These characters indicate that the saturation is sufficient. In this state, the solution of muriate of manganese is precipitated, of a deep brown, by the chloride of lime; the oxide being set free by the union of the muriatic acid with the lime, which the chlorine kept in suspension. It is obvious that the solution of the chloride contains lime foreign to its own composition, only in the state of muriate, of chlorate, or of lime water. Now the muriate and chlorate of lime give no precipitate with muriate of manganese; lime water it is true yields a brownish colour, but this proves to be of no importance, for on decomposing muriate of manganese, by equal volumes of lime water and solution of chloride reduced to 14°, more than 100 parts of hydrochlorate of manganese were necessary for the chloride of lime, while less than one part was sufficient for the lime water.

The advantage which the solution of muriate of manganese offers as a chlorometric substance, are threefold.

1. The uniform condition of the test.

2. The disengagement of the chlorine is produced by an acid which acts only while the metallic oxide, with which it is combined, is precipitated.

3. The precipitation of the oxide, which indicates the quantity of chlorine, precedes the disengagement of the gas, or at most is simultaneous with it; whereas in employing a solution of indigo, the chlorine becomes at first free to react on the colouring matter, the destruction of which serves as the measure of its quantity. Hence the trial by muriate of manganese can be made slowly, and is consequently more certain. [*Bib. Univ. and Silliman's Journal.*

Blowpipe Simplified.

A modification of the blowpipe has been contrived by *M. Danger*, and is described in the Bulletin d'Encouragement, which has simplicity and cheapness to recommend it. A wooden clamp, with a screw underneath to attach it to the edge of a table, has a hole bored vertically through it in front, and to this hole underneath is attached a tube, to the other end of which a bladder is tied. Another tube, which terminates with a jet piece, is attached to the hole above. It is obvious that if this bladder be inflated, and its sides pressed together by the knees of the operator, or by any other means, a stream of air will issue through the jet, and maintain the flame of the lamp. To keep up the supply of air, a mouth tube is inserted into a lateral opening in front of the clamp, and which reaches upwards to a convenient height for the mouth. By blowing into this tube occasionally, the supply of air in the bladder is preserved, and to prevent its return, a valve is placed at the end of the mouth tube. This valve is simply a piece of cork, fashioned to a conical opening in a tin or brass piece adjusted to the end of the tube. A short wire, fastened to the cork, passes freely through a little guide, and is provided with a catch to keep it just within the conical opening. The mouth tube may consist of two pieces, one sliding into the other, so as to be readily adjusted to any convenient length. The lamp should be covered, when in action, with a hood having two openings, one in front for the admission of the blowpipe, and the other opposite for the exit of the jet of flame. The air may be forced out of the bladder mechanically, by surrounding it with a coarse net of twine, and hanging a weight to the bottom of it. This blowpipe unites great simplicity to cheapness and facility of adjustment. [*Ib.*